

Firmware V5.20 Release Note

ZAP 6.0

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Firmware Release V5.20

1. Overview

This document provides firmware release information on Zyxel NXC WLAN Controller and Unified Access Points platforms, plus new features, enhancements, read me first before firmware upgrade, known issues and workarounds information for Release V5.20.

2. What's New in This Release

ZyXel Firmware Release V5.20 is an innovative firmware with Standalone and Managed AP support by default, a.k.a. ZyXel APFlex™ feature, enabling a zero-touch AP mode changing experience at initial installation.

With ZyXel Firmware Release V5.20, SMBs, Enterprises and Education Schools are able to enjoy a more performing and easier deploying wireless access service to fulfill diverse business requirement across multiple locations. The new features and enhancements in this release include:

- Proxy ARP Support per SSID on AP
- APFlex™ Supports Provision via Controller DNS Name
- DFS Channel Switch Enhancement in Manual Channel Config.
- FCC DFS support on NWA5123-AC HD & WAC6303D-S
- RADIUS Attribute – NAS IP Address & NAS Identifier
- AP System Name and Location (GUI & SNMP)
- AP Setup Wizard Enhancement
- Remove Station Signal Strength -50 Limitation
- ZDP 1.8.3 Support

3. Supported Platforms

ZyXEL WLAN Controller

- NXC2500 V5.20(AAIG.3)
- NXC5500 V5.20(AAOS.3)

ZyXEL Access Points

- NWA3160-N V5.10(UJA.3)
- NWA3550-N V5.10(UJB.3)
- NWA3560-N V5.10(UJC.3)
- NWA5160N V5.10(AAS.3)
- NWA5550-N V5.10(UJD.3)

- NWA5560-N V5.10(UJE.3)
- NWA5121-NI V5.10(AAID.3)
- NWA5123-NI V5.10(AAHY.3)
- NWA5121-N V5.10(AAIF.3)
- NWA5123-AC V5.20(AAZY.3)
- NWA5301-NJ V5.10(AANB.3)
- WAC6502D-E V5.20(AASD.3)
- WAC6502D-S V5.20(AASE.3)
- WAC6503D-S V5.20(AASF.3)
- WAC6553D-E V5.20(AASG.3)
- WAC6103D-I V5.20(AAXH.3)
- WAC5302D-S V5.20(ABFH.3)
- WAC6303D-S V5.20(ABGL.3)
- NWA5123-AC HD V5.20(ABIM.3)

4. Supported Utilities

Zyxel One Network (ZON):

Product	Series	Model
Wi-Fi Access Point	WAC6500 series	WAC6502D-E WAC6502D-S WAC6503D-S WAC6553D-E
	WAC6100 series	WAC6103D-I
	WAC6300 series	WAC6303D-S
	WAC5300 series	WAC5302D-S
	NWA5120 series	NWA5121-NI NWA5121-N NWA5123-NI NWA5123-AC NWA5123-AC HD
	NWA5301-NJ	NWA5301-NJ
NXC Controller	NXC series	NXC5500 NXC2500

Zyxel AP Configurator (ZAC):

Series	Access Point
Model	NWA5121-NI NWA5121-N NWA5123-NI NWA5123-AC NWA5123-AC HD NWA5301-NJ WAC5302D-S WAC6103D-I WAC6502D-E WAC6502D-S WAC6503D-S WAC6553D-E WAC6303D-S

* ZAC configuration of Access Point is supported with Standalone AP mode.

Zyxel Wireless Optimizer (ZWO)

Series	Access Point	Wireless LAN Controller
Model	NWA3160-N NWA3560-N NWA3550-N NWA5160N NWA5560-N NWA5550-N NWA5123-AC NWA5121-NI NWA5121-N NWA5123-NI NWA5123-AC HD NWA5301-NJ WAC5302D-S WAC6103D-I WAC6502D-E WAC6502D-S WAC6503D-S WAC6553D-E WAC6303D-S	NXC2500

5. Files lists contains in the Release ZIP file

File name: *.bin

Purpose: This binary firmware image file is for normal system update.

Note: The firmware update may take five or more minutes depending on the scale of device configuration. The more complex configuration will take more update time. Do not turn off or reset the NXC2500 while the firmware update is in progress. The firmware might get damaged, if device loss power or you reset the device during the firmware upload.

You might need to refer to Appendix 2 of this document to recover the firmware.

File name: *.conf

Purpose: This ASCII file contains default system configuration commands.

File name: *.ri

Purpose: This binary firmware recovery image file is for emergent system firmware damage recovery only.

File name: *-MIB.zip

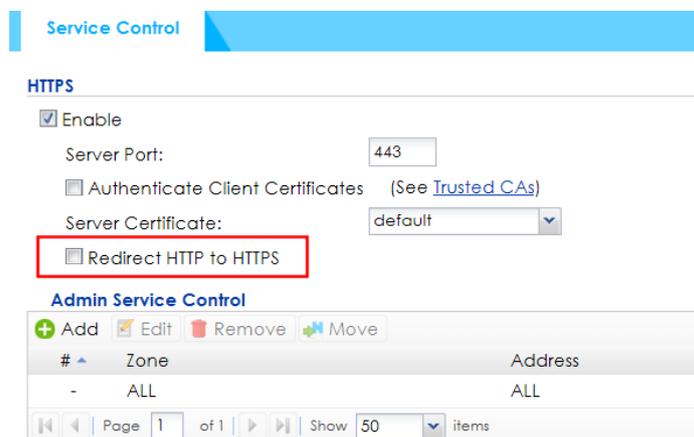
Purpose: The MIBs are to collect information on device. The focus of the MIBs is to let administrators collect statistical data and monitor status and performance.

6. Read Me First before Upgrade

This section encompasses important notes while upgrading this firmware release for Zyxel NXC controllers and Zyxel Access Points.

Zyxel NXC WLAN Controller

1. FW v5.20 has a known issue of Apple Captive Network Assistant (CNA) page cannot display a popup properly. The workaround is to disable "Redirect HTTP to HTTPS".



The screenshot shows the 'Service Control' configuration page. Under the 'HTTPS' section, the 'Enable' checkbox is checked. The 'Server Port' is set to 443. The 'Authenticate Client Certificates' checkbox is unchecked, with a link to 'Trusted CAs'. The 'Server Certificate' dropdown is set to 'default'. The 'Redirect HTTP to HTTPS' checkbox is unchecked and highlighted with a red box. Below this is the 'Admin Service Control' section, which includes a table with columns for '#', 'Zone', and 'Address'. The table contains one entry: '#', 'ALL', 'ALL'. The table has navigation buttons for 'Add', 'Edit', 'Remove', and 'Move'. At the bottom, there are pagination controls showing 'Page 1 of 1' and 'Show 50 items'.

2. Following NXC features in the FW v5.20 are BETA version.
 - NXC2500 Setup Wizard ^{BETA}
 - Legacy 802.11a/b/g Clients Rejection ^{BETA}
 - AP firmware upgrade by group on NXC ^{BETA}
 - Proxy ARP Support per SSID on AP ^{BETA}

Zyxel Access Points

1. From FW v5.20, NWA1123-ACv2, NWA1123-AC PRO and NWA1123-AC HD will start to support Nebula Management mode. For NWA1120 series release note, please refer to https://www.zyxel.com/support/download_landing.shtml for more details.
2. AP models listed below will stay in the FW v5.10 release. NXC controllers with FW v5.20 or above still can manage the following APs; however, these APs cannot support new features available on the v5.20 or above, e.g. Proxy ARP Support per SSID on AP ^{BETA} in v5.20.
 - NWA3160-N
 - NWA3550-N
 - NWA3560-N
 - NWA5160N
 - NWA5550-N
 - NWA5560-N
 - NWA5121-N
 - NWA5121-NI
 - NWA5123-NI
 - NWA5301-NJ

7. Enhancements

This section briefly illustrates the enhancements in this firmware V5.20 release.

- Proxy ARP Support per SSID on AP

The screenshot shows a configuration page for a profile named 'Wiz_SSID_4'. The SSID is 'Zyxel', Security Profile is 'Wiz_SEC_Profile_4', MAC Filtering Profile is 'disable', Layer-2 Isolation Profile is 'disable', and QoS is 'WMM'. Under 'Rate Limiting (Per Station Traffic Rate)', Downlink and Uplink are both set to '0' mbps. Band Select is 'disable' and Forwarding Mode is 'localbridge'. The VLAN ID is '1'. At the bottom, several checkboxes are visible: 'Hidden SSID', 'Enable Intra-BSS Traffic blocking', 'Enable U-APSD', 'Enable ARP Proxy' (which is checked and highlighted with a red box), and 'Schedule SSID'.

- DFS Channel Switch Enhancement in Manual Channel Config.
From FW v5.20, when Manual Channel Selection is DFS channel, the default behavior is DFS Recover. If the AP detects RADAR signal, the AP will randomly switch to another channel and provide wireless service. After the CAC period (e.g. 1 min.) ends, the AP will revert to the original channel.

Another option is DFS Quiet via CLI configuration. If the AP detects RADAR signal, its radio interface will be down until the CAC period end (e.g. 1 min.) and the AP will stay in the original channel.

			DFS-Recover (Default behavior)	DFS-Quiet
AP/Root AP	Manual channel configuration	2.4GHz	Not applicable	
		5GHz	Either DFS-Recover or DFS-Quiet	
	DCS	Auto	Not applicable	
		Manual channel	Not applicable	
Repeater AP			Not applicable	

- RADIUS Attribute – NAS IP Address & NAS Identifier

Primary Accounting Server Activate
Accounting Server IP Address:
Accounting Server Port: (1~65535)
Accounting Share Secret:
 Secondary Accounting Server Activate
Accounting Server IP Address:
Accounting Server Port: (1~65535)
Accounting Share Secret:
 Accounting Interim Update
Interim Update Interval: (1-1440 minutes)
General Server Settings

NAS IP Address: (Optional)
 NAS Identifier: (Optional)

- AP System Name and Location (GUI & SNMP)

Edit AP List AP Setting

Create new Object ▾

Configuration

MAC: 58:8B:F3:91:13:B6

Model: n/a

Description:

Group setting: ▾

System Name: (Optional)

Location: (Optional)

Edit AP Group Profile default AP Group Setting

General Settings

Group Name: default

Description: (Optional)

Location: (Optional)

- AP Setup Wizard Enhancement

Wizard setting

Step 1 Welcome to the Setup Wizard

Time Settings

Country Code:

Time Zone:

Enable Daylight Saving

Start Date: of at :

End Date: of at :

Offset: Hours

Support auto detect Time Zone

Wizard setting

Step 1

Step 2 **Change Password:**

New Password:

Retype Password:

Uplink Connection:

Auto(DHCP) Static IP

IP Address:

Subnet Mask:

Gateway:

DNS Server:

Support admin password change in Setup Wizard

- Remove Station Signal Strength -50 Limitation

The screenshot shows the ZYXEL NX5500 web interface. The 'Station List' table is displayed with the following columns: association time, Capability, MAC Address, Security Mode, Signal Strength, Channel, Band, Tx, and Rx. The Signal Strength column is highlighted with a red box. The table contains 15 rows of data.

association time	Capability	MAC Address	Security Mode	Signal Strength	Channel	Band	Tx	Rx
018/01/02 13:46:11	802.11a/b/g/n	B8:8D:12:04:0...	WPA2-PSK	-50dBm	149	5G	376753	345518
017/12/31 10:46:55	802.11b/g	78:11:DC:0F:6...	WPA2-PSK	-56dBm	6	2.4G	14652706	125211766
018/01/02 12:59:20	802.11ac	B8:53:AC:87:5...	WPA2-PSK	-66dBm	6	2.4G	15962028	1433339
018/01/02 09:40:52	802.11ac	00:9E:C8:54:9...	WPA2-PSK	-56dBm	149	5G	1669371	11545
017/12/30 05:29:56	802.11b/g/n	A8:06:00:C6:...	WPA2-PSK	-41dBm	11	2.4G	625428376	18371161
017/12/28 17:25:11	802.11ac	0C:51:01:C5:9...	WPA2-PSK	-55dBm	149	5G	1363000617	129383601
017/12/28 11:21:34	802.11ac	08:66:98:99:3...	WPA2-PSK	-59dBm	48	5G	387912900	173769115
018/01/01 15:27:04	802.11b/g/n	38:D5:47:D2:1...	WPA2-PSK	-66dBm	6	2.4G	210484957	11347611
017/12/28 17:25:21	802.11a/b/g/n	00:9E:C8:96:0...	WPA2-PSK	-54dBm	149	5G	666401435	31105549
018/01/02 13:33:13	802.11a/b/g/n	A0:A8:CD:DF:...	WPA2-PSK	-63dBm	48	5G	20683744	4175150
018/01/02 13:28:11	802.11a/b/g/n	A4:4E:31:95:7...	WPA2-PSK	-59dBm	48	5G	56215102	5720129

8. Resolved Issues

- [SPR: 170803121]
[eITS: 170800079]
[Symptom] After upgrading the FW from 4.22 to 5.00, all APs are offline
- [SPR: 170804178]
[eITS: 170700754]
[Symptom] The Daily report fails with authentication issue.
- [SPR: 170809411]
[eITS: 170800164]
[Symptom] When connecting to AP with FileZilla FTP client, the FTP server claimed it supported 'AUTH TLS' command. But when the client used TLS to connect to FTP server, TLS handshake failed because the server did not send certificate.
- [SPR: 170814634]
[eITS: 170800392]
[Symptom] Add one Address/PTR Record, it works fine. But when add two or more A-Record on "Address / PTR Record" configuration, DNS doesn't work properly.

5. [SPR: 1708231096]
[eITS: 170800650]
[Symptom] The users can't be forced logout from logged in user list because the length of the user id logged in captive portal by RADIUS server is over 32 characters.

6. [SPR: 1708241164]
[eITS: 170800622]
[Symptom] The AP will reboot when there are two stations playing YouTube in different VLANs, and it only happened on WAC5302D-S/WAC6303D-S/NWA5123-AC HD.

7. [SPR: 1708251192]
[eITS: 170800232]
[Symptom] When the WAC6103D-I AP is managed by NXC5500 controller, there is no LED status for WAC6103D-I Uplink LED after the IP of AP is changed by ZON.

8. [SPR: 1708301305]
[eITS: 170700719]
[Symptom] The NWA5121-NI APs managed on NXC2500 sometimes stop working because the APs fail to do DCS channel change.

9. [SPR: 170905123]
[eITS: 170900158]
[Symptom] [Vulnerability] WPA2 protocol key reinstallation attacks

10. [SPR: 170911168]
[eITS: 170900295]
[Symptom] In the scenario of MAC authentication fallback to Web authentication plus the captive portal redirect on the controller, after passing MAC Auth., users may still see captive portal due to timing issues.

11. [SPR: 170914224]
[eITS: 170800934]
[Symptom] When the user kept the aware page after captive portal login and then encountered network problem, the browser will pop up a message of "you will be redirected to the login page due to idle timeout or network problem". After the user pressed "OK", the user will be redirected to the captive portal login page and requested to re-login, however the user's access time has not reached the time duration yet.

12. [SPR: 170925414]
[eITS: 170800256]
[Symptom] User aware page will be redirected to admin page when the auth. token has dash symbol in the first character.

13. [SPR: 171017195]
[eITS: 171000202]
[Symptom] It failed to use the wizard to change the admin security password.

14. [SPR: 171017200]
[eITS: 171000552]
[Symptom] The traffic of single station in Top N is more than the total traffic of any AP.

15. [SPR: 171101007]
[eITS: 171001183]
[Symptom] The WAC5302D-S/ WAC6303D-S/ NWA5123-AC HD showed internal error: Oops.

16. [SPR: 171101009]
[eITS: 171001181]
[Symptom] The WAC5302D-S/ WAC6303D-S/ NWA5123-AC HD showed soft lockup - CPU#0 stuck.

17. [SPR: 171123330]
[eITS: 171100395]
[Symptom] When performing SNMP query for "sysLocation" via any SNMP Linux client, the return information is incomplete.

18. [SPR: 171213166]
[eITS: 171100658]
[Symptom] For iOS 11 users, in the scenario of enabling redirect http to https plus 802.1X authentication, when iOS 11 users connect to WiFi, the login page will pop up, then the WiFi will disconnect automatically and user will revert to the desktop.

19. [SPR: 160726983]
[eITS: 160700179]
[Symptom] While enabling the Captive Portal redirect on AP, it requested iOS Clients re-log in after disconnecting the SSID.

20. [SPR: 171115187]
[eITS: 171100528]
[Symptom] Wording display incorrect on user aware page when the iPhone clients log in different captive portal successfully.

9. Design Limitations and Known Issues

This section describes the system behavior or limitations in this firmware release. They will be created into knowledge base.

Design Limitations

Zyxel NXC WLAN Controller and Managed AP Mode

N/A

Zyxel Access Points

1. For following models, TKIP is not supported:
NWA5123-AC HD
WAC5302D-S
WAC6303D-S
2. WAC5302 does not support SNMPv1.

Known Issues

Zyxel NXC WLAN Controller and Managed AP Mode

GUI:

1. [SPR: 140701012]
[Symptom] Plug in two USB thumb drives, the GUI shows only one USB Virtual Device in the Dashboard page.
2. [SPR: 150728882]
[Symptom] If creating an ext-group-user in User/Group page, and "Associated AAA Server Object" select AD-Server, the object reference of hyper link will redirect to the wrong page.
3. [SPR: 151103048]

[Symptom] Configure the 2.4GHz channel width as 20/40MHz for NWA3560-N, GUI channel width does not change to 20MHz on the GUI, but it is actually 20MHz configured.

4. [SPR: 151123781]

[Symptom] The value character can't have "_" in AAA Server' name for AD, LDAP, RADIUS server and cannot exceed 30 characters in RADIUS server.

5. [SPR: 151214770]

[Symptom] NXC Dashboard displays error with Microsoft Internet Explorer 10.

6. [SPR: 160308287]

[Symptom] There is an additional null row at the bottom of AP list.

7. [SPR: 160531033]

[Symptom] The SSID page "Object Name" , the hyperlink cannot be redirected back.

8. [SPR: 170901036]

[Symptom] After clicking "Help", it's not able to search the keyword e.g. "RTS" or "radio" at every first time. The keyword can be searched at the second time.

9. [SPR: 170804234]

[Symptom] The preview customized page is different from captive portal login page

Monitor Mode:

1. [SPR: 140624104]

[Symptom] Inactivate Mon Mode profile, it will still keep device list in Detected Device.

2. [SPR: 140922844]

[Symptom] The old SSID data are not cleaned if all aps from MON mode to AP mode in Detected Device.

Wireless:

1. [SPR: 140820699]
[Symptom] Wireless client cannot be authorized with EAP TTLS (Mschapv2), if controller uses following settings:
 - i. 802.1X
 - ii. Security: none
 - iii. Authentication method: local database

2. [SPR: 140820701]
[Symptom] Wireless client cannot be authorized with EAP PEAP (Mschapv2), if Controller uses following settings:
 - i. 802.1X
 - ii. Security: none
 - iii. Authentication method: local database

3. [SPR: 140820702]
[Symptom] Wireless client cannot be authorized with EAP PEAP (TLS), if controller uses following settings
 - i. 802.1X
 - ii. Security: none
 - iii. Authentication method: local database

4. [SPR: 141211739]
[Symptom] When SSID name with three spaces sequentially, it causes GUI display incorrectly.

5. [SPR: 161205035]
[Symptom] For WAC5302D-s, when enable Load Balancing (count=2), first 7 clients can connect, but the 8th client can't connect.

WDS:

1. [SPR: 150717134]
[Symptom] If the Repeater AP's Ethernet port is attached to Lan1 port instead of Uplink port, the network will loop.
2. [SPR: 160202129]
[Symptom] In ZyMesh deployment, AP may have mesh disconnect log in some extreme cases due to driver issues, the log is triggered by the workaround embedded in the firmware. When it happens, the AP mesh link will disconnect and reconnect instantly, there is no significant wireless connection impact in general applications.

CAPWAP:

1. [SPR: 150526058]
[Symptom] Some station info will be kept in station info list on the NXC controller even the stations have been dissociated from the AP.

System:

1. [SPR: 140822847]
[Symptom] If user types are "user" or "limited-admin", user is able to perform ftp login on fat AP.
2. [SPR: 140919757]
[Symptom] Power management in WAC6503D-S Standalone mode is incorrect if using PoE 802.3af mode.
3. [SPR: 141111336]
[Symptom] While editing LAN PVID in AP Group Setting > Port Setting, the setting will apply to managed AP immediately even if Cancel button is clicked on AP Group Setting page.
4. [SPR: 141126208]
[Symptom] When VLAN interface gateway does not set, the Metric is

not grayed out.

SNMP:

1. [SPR: 150508405]
[Symptom] The OID value of “station associated time” displays the wrong time format.

Configuration Backup/Restore:

1. [SPR: 150525002]
[Symptom] If the configuration name is started with symbolic characters “.”, the GUI will show ‘Operation is prohibited’.

AAA:

1. [SPR: 140818646]
[Symptom] When client rejects by RADIUS, controller does not show the log of reject reason.
2. [SPR: 150709611]
[Symptom] When change the default order and priority of the authentication methods on the NXC controller or server IP address, it may occur the users cannot pass the authentication.
3. [SPR: 160506735]
[Symptom] Set up Accounting Max retry count = 3, when the accounting server is not be found, the Radius internal 802.1x will not retry 3 times.
4. [SPR: 160602137]
[Symptom] If browser is used the Firefox, the account and password will be display on GUI.

5. [SPR: 170728906]
[Symptom] If there are more than 2 WAC5302/WAC6303/NWA5123-AC-HD behind the same NAT, it may cause the computer authentication failed.
6. [SPR: 161202019]
[Symptom] The authentication is failed when the station used the EAP-TTLS (MSCHAPv2 & PAP). It passed by using EAP-TTLS (MSCHAPv2 & PEAP).

Captive Portal:

1. [SPR: 140820735]
[Symptom] When wireless client disassociated but login user will not be logout from controller.
2. [SPR: 170804234]
[Symptom] The preview customized page is different form captive portal login page
3. [SPR: 171027409]
[eITS: 171000785]
[Symptom] iPhone iOS 11 connected the SSID with captive portal after a few seconds, the portal page is not redirected and Wi-Fi will disconnect. (Workaround: disable redirect http to https)
4. [SPR: 180117187]
[Symptom] User opened the external web portal authentication with a URL "https://IP" via Microsoft IE 11(11.0.49) browser then cleaned the cookie and re-opened the IE 11 browser 2nd time, it may not correctly display the Welcome/Session/Error/User-logout pages.

ZON:

1. [SPR: 151120733]
[Symptom] If managed AP was enabled LED locator by using ZON

utility, the type of icon should be changed to flash icon but managed AP does not.

Rate Limit:

1. [SPR: 160802043]
[Symptom] Rate limit using tunnel mode with management VLAN (2~4094) cause station upload rate limit can not work.

Auto Healing:

1. [SPR: 150513963]
[Symptom] NXC2500's Auto Healing Log and console log cannot update AP Description in time.

Web Wizard ^{BETA}:

1. [SPR: 170707280]
[Symptom] AP-group & Security profile generated by web wizard can not be edited.
2. [SPR: 170822056]
[Symptom] Country code of radio profile generated by wizard will not be updated if user using wizard to config again.

Zyxel Access Points in Standalone Mode

1. [SPR: 141204234]
[Symptom] Using IE11 and Chrome cannot login to Standalone AP when enabling Https and Authenticate Client Certificates.
2. [SPR: 140625215]
[Symptom] The SNMPv1 cannot work on Standalone AP.
3. [SPR: 150114622]
[eITS: 150100208]

[Symptom] The error message "Do NTP update has failed" shows up when pressing "Sync. Now" button from Date/Time configuration page on Repeater AP.

4. [SPR: 160223491]

[Symptom] If client connect to SSID VLAN(2~4094),daily report does not display radio traffic.

5. [SPR: 160330505]

[Symptom] Accounting Interim Update should be gray out on the GUI when the authentication Settings set as PSK.

Appendix - A. System Default Setting

Zyxel NXC WLAN Controller

Following is the system default configuration

- The default device information for NXC controllers
IP: 192.168.1.1
Administration username: admin
Password: 1234
- The default LAN interface is vlan0. The default LAN subnet is 192.168.1.0/24.
- By default, SSH service can only be accessed from LAN subnet.

Zyxel Access Points

- For AP in Standalone mode, following is the system default configuration:
The default device information for Unified Access Points
IP: 192.168.1.2
Administration username: admin
Password: 1234
- For AP in Managed AP mode by default, DHCP client enabled is by default.

Appendix - B. Firmware Upgrade / Downgrade Procedure

The following is the firmware **upgrade** procedure:

1. If user did not backup the configuration file before firmware upgrade, please follow the procedures below:
 - Use Browser to login into NXC2500 as administrator.
 - Click Maintenance > File Manager > Configuration File to open the Configuration File screen. Use the Configuration File screen to backup current configuration file.
 - Find firmware at www.Zyxel.com in a file that (usually) uses the system model name with the .bin extension, for example, "**520AIG3C0.bin**".
 - Click Maintenance > File Manager > Firmware Package to open the Firmware Package screen. Browser to the location of firmware package and then click Upload. The NXC2500 automatically reboots after a successful upload.
 - After several minutes, the system is successfully upgraded to newest version.

The following is the firmware **downgrade** procedure:

(We do not recommend user to downgrade f/w of device.)

1. If user has already backup the configuration file before firmware upgrade, please follow the procedures below:
 - Use Console/Telnet /SSH to login into NXC2500.
 - Router>**enable**
 - Router#**configure terminal**
 - Router(config)#**setenv-startup stop-on-error off**
 - Router(config)#**write**
 - Load the older firmware to NXC2500 using standard firmware upload procedure.
 - After system uploads and boot-up successfully, login into NXC2500 via GUI.
 - Go to GUI → "File Manager" menu, select the backup configuration filename, for example, statup-config-backup.conf and press "Apply" button.
 - After several minutes, the system is successfully downgraded to older version.

2. If user did not backup the configuration file before firmware upgrade, please follow the procedures below:
 1. Use Console/Telnet /SSH to login into NXC2500.
 2. Router>**enable**
 3. Router#**configure terminal**
 4. Router(config)#**setenv-startup stop-on-error off**
 5. Router(config)#**write**
 6. Load the older firmware to NXC2500 using standard firmware upload procedure.
 7. After system upload and boot-up successfully, login into NXC2500 via Console/Telnet/SSH.
 8. Router>**enable**
 9. Router#**write**

Now the system is successfully downgraded to older version.

Note: NXC2500 might lose some configuration settings during this downgrade procedure. It is caused by configuration conflict between older and newer firmware version. If this situation happens, user needs to configure these settings again.

Appendix - C. SNMPv3 private MIBS support

SNMPv3 private MIBs provides user to monitor NXC2500 platform status. If user wants to use this feature, you must prepare the following step:

1. Have NXC2500 mib file and install to your MIBs application (like MIB-browser).
2. NXC2500 SNMP is enabled.
3. Using your MIBs application connects to NXC2500

Appendix - D. Firmware Recovery

In some rare situation, NXC2500 might not boot up successfully after firmware upgrade. The following procedures are the steps to recover firmware to normal condition. Please connect console cable to NXC2500.

If NXC2500 Booting failed, NXC2500 will automatically perform the "Restore Firmware" process. Example: The device show "Bad Data CRC" while uncompressing "Kernel Image".

```

BootModule Version: V1.00 | 2013-03-29 15:39:33
DRAM: Size = 1024 Mbytes

Kernel Version: V2.6.32.27 | 2013-05-23 19:55:22
ZLD Version: V4.00(AAIG.1) | 2013-05-28 09:35:00
CAPWAP Version: V1.00.02

MMC read: dev # 0, block # 2048, count 2048 ... 2048 blocks read: OK

Press any key to enter debug mode within 3 seconds.

BM cmd line: console=ttyS0,115200 numcores=2 mem=1024M
local_args[0]=bootm, local_args[1]=0x20000000
Execute Command (Load Normal Kernel): mmc read 0 0x20000000 0x32801 0x27fff

MMC read: dev # 0, block # 206849, count 163839 ... 163839 blocks read: OK
## Booting kernel from Legacy Image at 20000000 ...
Image Name:      Linux Kernel Image
Created:         2013-05-06  8:05:04 UTC
Image Type:     MIPS Linux Kernel Image (lzma compressed)
Data Size:      2931281 Bytes = 2.8 MiB
Load Address:   05000000
Entry Point:    80101400
Verifying Checksum ... Bad Data CRC
ERROR: can't get kernel image!
Execute Command (Load Recovery Kernel): mmc read 0 0x20000000 0xa800 0x28000

```

1. Restore Firmware

- If "Connect a computer to port 1 and FTP to 192.168.1.1 to upload the new file" displays on the screen, you need to recover the firmware by the following procedure.

Connect a computer to port 1 and FTP to 192.168.1.1 to upload the new file.

- You will use FTP to upload the firmware package. Keep the console session open in order to see when the firmware recovery finishes.
- Set your computer to use a static IP address from 192.168.1.2 ~ 192.168.1.254. No matter how you have configured the NXC2500's IP addresses, your computer must use a static IP address in this range to recover the firmware.
- Connect your computer to the NXC2500's port 1 (the only port that you can use for recovering the firmware).
- Use an FTP client on your computer to connect to the NXC2500. This example uses the ftp command in the Windows command

prompt. The NXC2500's FTP server IP address for firmware recovery is 192.168.1.1

- Log in without user name (just press enter).
- Set the transfer mode to binary. Use "bin" (or just "bi" in the Windows command prompt).
- Transfer the firmware file from your computer to the NXC2500 (the command is "put 520AAIG3C0.bin" in the Windows command prompt).

```
c:\users\zt01571\documents\esbu\nxc2500\Patch1C0\400AAIG1C0>ftp 192.168.1.1
Connected to 192.168.1.1.
220-=(<?>)=-.: ( ( Welcome to PureFTPd 1.0.11 )) .:.-=(<?>)-
220-You are user number 1 of 50 allowed
220-Local time is now 00:04 and the load is 0.00. Server port: 21.
220-Only anonymous FTP is allowed here
220 You will be disconnected after 15 minutes of inactivity.
User (192.168.1.1:(none)):
230 Anonymous user logged in
ftp> bin
200 TYPE is now 8-bit binary
ftp> put 400AAIG1C0.bin
```

- Wait for the file transfer to complete.

```
200 PORT command successful
150 Connecting to port 61419
226-399.5 Mbytes free disk space
226-File successfully transferred
226 8.191 seconds (measured here), 11.08 Mbytes per second
ftp: 95152648 bytes sent in 8.195seconds 11620.99Kbytes/sec.
ftp>
```

- The console session displays "Firmware received" after the FTP file transfer is complete. Then you need to wait while the NXC2500 recovers the firmware (this may take up to 4 minutes).

```
Firmware received ...
Start to check file system...
/dev/mmcblk0p6: 42/30720 files (4.8% non-contiguous), 47789/122880 blocks
/dev/mmcblk0p7: 132/131072 files (2.3% non-contiguous), 17447/26kjournal starting. Commit interval 5 seconds
2144 blocks
Done
Updating ...
```

- The message here might be "ZLD-current received". Actually, it is equivalent to "Firmware received".

```
ZLD-current received ...
```

```
[Update Filesystem]
  Updating Code
```

- The console session displays “done” when the firmware recovery is complete. Then the NXC2500 automatically restarts.

```
[Updating] /share/wtp_image/NWA5KCN50
[Updating] done.
[Updating] /share/wtp_image/wtpinfo
[Updating] done.
rmdir/mkdir /tmp/p6
mount -t ext3 /dev/mmcb1k0p6 /tmp/p6
[Updating] /tmp/p6/compress.img
[Updating] done.
umount/rmdir /tmp/p6
[Updating] touch .fsextract_done is done
mount: mount point /etc/zyxel/ftp/wtp_image/real_wtp_image/ does not exist
Error: We can't mount real_wtp_image partition
md: stopping all md devices.
Restarting system.
```

- The username prompt displays after the NXC2500 starts up successfully. The firmware recovery process is now complete and the NXC2500 is ready to use.
- If one of the following cases occurs, you need to do the “firmware recovery process” again. Note that if the process is done several time but the problem remains, please collect all the console logs and send to Zyxel for further analysis.

Appendix - E. ATSH Information

Here is the information displayed by ATSH command in debug mode.

ModelID: 09E1 (4G eMMC)

```
Router> psm
Router(psm)# atsh
Kernel Version      : V2.6.32.27 | 2018-02-08 06:49:41
ZLD Version         : V5.20(AAIG.3) | 2018-02-08 06:51:44
BootModule Version  : V1.06 | 2017-03-28 | 15:34:26
Vendor Name         : Zyxel
Product Model       : NXC2500
System Type         : 10
First MAC Address   : B8ECA31B5443
Last MAC Address    : B8ECA31B5448
MAC Quantity        : 6
Default Country Code : FF
Boot Module Debug Flag : 00
Hardware Version    : Zyxel NXC2500 CN60xx
Serial Number       : S162L50200168
Baud Rate           : 115200 bps
BM Checksum         : 36363730
Core Checksum       : 0000A042
Conf Checksum       : DA6BC69B
SNMP MIB level & OID : 060102030405060708091011121314151617181920
Main Feature Bit    : 00
Other Feature Bits   :
E1 09 00 00 00 00 00 00-00 00 00 00 00 00 00 00
06 00 00 00 00 00 00 00-00 00 00 00 00 00 00
```

ModelID: 48E1 (8G eMMC)

```
Router> psm
Router(psm)# atsh
Kernel Version      : V2.6.32.27 | 2018-02-08 06:49:41
ZLD Version         : V5.20(AAIG.3) | 2018-02-08 06:51:44
BootModule Version  : V1.06 | 2017-03-28 | 15:34:26
Vendor Name         : Zyxel
Product Model       : NXC2500
System Type         : 10
First MAC Address   : 1C740DF81DF2
Last MAC Address    : 1C740DF81DF7
MAC Quantity        : 6
Default Country Code : FF
Boot Module Debug Flag : 00
Hardware Version    : Zyxel NXC2500 CN60xx
Serial Number       : S162L13100644
Baud Rate           : 115200 bps
BM Checksum         : 36363730
Core Checksum       : 0000A042
Conf Checksum       : DA6BC69B
SNMP MIB level & OID : 060102030405060708091011121314151617181920
Main Feature Bit    : 00
Other Feature Bits   :
E1 48 00 00 00 00 00 00-00 00 00 00 00 00 00 00
06 00 00 00 00 00 00 00-00 00 00 00 00 00 00
```

Appendix - F. ATCI Information

Here is the information displayed by ATCI command in debug mode.

```
Router> psm
Router(psm)# atci
-----
ACCapwapVersion      : 1.00.03

Supported Image Number : 9
Image index          : 1
  Image file name     : /etc/zyxel/ftp/wtp_image/wac6500
  ZLD Checksum        : C756BF7D
  Supported Model 1   : WAC6502D-E (1AE1)
  FirmwareVersion    : V5.20(AASD.3)
  Supported Model 2   : WAC6502D-S (1BE1)
  FirmwareVersion    : V5.20(AASE.3)
  Supported Model 3   : WAC6503D-S (1CE1)
  FirmwareVersion    : V5.20(AASF.3)
  Supported Model 4   : WAC6553D-E (1DE1)
  FirmwareVersion    : V5.20(AASG.3)
CapwapVersion        : 1.00.03

Image index          : 2
  Image file name     : /etc/zyxel/ftp/wtp_image/wac5300
  ZLD Checksum        : C3F41F18
  Supported Model 1   : WAC5302D-S (37E1)
  FirmwareVersion    : V5.20(ABFH.3)
CapwapVersion        : 1.00.03

Image index          : 3
  Image file name     : /etc/zyxel/ftp/wtp_image/nwa5301
  ZLD Checksum        : 798F5F3F
  Supported Model 1   : NWA5301-NJ (15E1)
  FirmwareVersion    : V5.10(AANB.3)
```

CapwapVersion	: 1.00.03
Image index	: 4
Image file name	: /etc/zyxel/ftp/wtp_image/wac6300
ZLD Checksum	: 5F54C906
Supported Model 1	: WAC6303D-S (3EE1)
FirmwareVersion	: V5.20(ABGL.3)
CapwapVersion	: 1.00.03
Image index	: 5
Image file name	: /etc/zyxel/ftp/wtp_image/nwa5120
ZLD Checksum	: 14F85136
Supported Model 1	: NWA5121-NI (9D03)
FirmwareVersion	: V5.10(AAID.3)
Supported Model 2	: NWA5123-NI (07E1)
FirmwareVersion	: V5.10(AAHY.3)
Supported Model 3	: NWA5121-N (08E1)
FirmwareVersion	: V5.10(AAIF.3)
CapwapVersion	: 1.00.03
Image index	: 6
Image file name	: /etc/zyxel/ftp/wtp_image/nwa5kcn50
ZLD Checksum	: 561C9FFA
Core Checksum	: 6087DE5E
Supported Model 1	: NWA5160N (1B00)
FirmwareVersion	: V5.10(AAS.3)
Supported Model 2	: NWA5560-N (9503)
FirmwareVersion	: V5.10(UJE.3)
Supported Model 3	: NWA5550-N (9603)
FirmwareVersion	: V5.10(UJD.3)
CapwapVersion	: 1.00.03
Image index	: 7
Image file name	: /etc/zyxel/ftp/wtp_image/nwa5123-ac
ZLD Checksum	: A3229119

Supported Model 1	: NWA5123-AC (26E1)
FirmwareVersion	: V5.20(AAZY.3)
CapwapVersion	: 1.00.03
Image index	: 8
Image file name	: /etc/zyxel/ftp/wtp_image/nwa5123-ac-hd
ZLD Checksum	: 503D1A9E
Supported Model 1	: NWA5123-AC-HD (43E1)
FirmwareVersion	: V5.20(ABIM.3)
CapwapVersion	: 1.00.03
Image index	: 9
Image file name	: /etc/zyxel/ftp/wtp_image/wac6100
ZLD Checksum	: 7D4FB9E1
Supported Model 1	: WAC6103D-I (25E1)
FirmwareVersion	: V5.20(AAXH.3)
CapwapVersion	: 1.00.03

Appendix - F. Check list for the items may be related to HW functions

Items	Any change?	Comments
Modem code		
Wireless driver		
Dying gasp		
LED behavior		
Temperature sensor control		
Others		

Appendix - H. File checksum information (AC only)

```
Router> debug _showfilechksum
622b5426b7657bb3471ebad6bc9292cc /rw/fwversion
8abb32e1cfe3b1f3ca45ee7ddd665047
/rw/etc_writable/zyxel/conf/__eps_checking_default.xml
1a1ade0b2fb1c7b289f98a70e91cc83b
/rw/etc_writable/zyxel/conf/__system_default.xml
124542264e13f35625e00ac6743c2d6d
/rw/etc_writable/zyxel/conf/__firewall_default.xml
48643b1a160666fa8ceba0468459fa7e
/rw/etc_writable/zyxel/conf/startup-config-firewall.xml
418b6cf7920683c0b4d7a3031ae9a1e5 /rw/etc_writable/dhcp6c-script
d41d8cd98f00b204e9800998ecf8427e /rw/etc_writable/budget/budget.conf
d41d8cd98f00b204e9800998ecf8427e
/rw/etc_writable/firmware-upgraded-cli-change
2e4ba2277d73b9e379e66fade7fb2559 /rw/compress.img
622b5426b7657bb3471ebad6bc9292cc /rw/fwversion.tmp
0d8df677a1e907240ed9583ce79167a3 /rw/filechecksum.tmp
0d8df677a1e907240ed9583ce79167a3 /rw/filechecksum
```