

## WiNG 5.9.3.0-18R Release Notes

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### OVERVIEW

WiNG 5.9.3 is a minor release that continues to build on the innovative WiNG 5 architecture across 802.11n and 802.11ac Enterprise WLAN portfolio.

NSight 5.9.3 support – Application Platform for NSight will be released as a separate build at a later time.

In addition, WiNG 5.9.3 release includes several new feature enhancements and critical customer fixes.

### 1. PLATFORMS SUPPORTED

The following AP hardware platforms – AP 621, AP 622, AP 650, AP 6511, AP 6511E, AP 6521, AP 6532, AP 7131, AP 7181, AP 8122, AP 8132, AP 8222, AP 8232, ES 6510 are EOL and engineering software support has ended. No new images will be released or supported for those platforms.

The following Controller hardware platforms - RFS 4011, RFS 6000, RFS 7000, NX 9000, NX 45XX and NX 65XX platforms are EOL and engineering software support has ended. No new images will be released or supported for those platforms.

WiNG 5.9.3 release firmware keeps the CLI references for these EOL platforms to support backward compatibility on downgrade of the network to prior WiNG releases.

**Important:** Image name change:

NX 9500 image is now called NX9500-<version>.img and not NX9000-<version>.img as in previous releases.

AP 7161 image is now called AP7161-<version>.img and not AP71XX-<version>.img as in previous releases.

AP 8232 image is now called AP8232-<version>.img and not AP82XX-<version>.img as in previous releases.

Note:

APXXXX-LEAN-5.9.3.0-018R.img - built **without GUI component**. AP lean images are also bundled within controller full image.

NXXXXX-LEAN-5.9.3.0-018R.img – built **without AP images**.

WiNG 5.9.3 supports the following platforms with the corresponding firmware images:

Controller Platform	Firmware Image
RFS 4010	RFS4000-5.9.3.0-018R.img, RFS4000-LEAN-5.9.3.0-018R.img
NX 9500/ NX 9510	NX9500-5.9.3.0-018R.img, NX9500-LEAN-5.9.3.0-018R.img
NX 9600 / NX 9610	NX9600-5.9.3.0-018R.img, NX9600-LEAN-5.9.3.0-018R.img
NX 75XX	NX7500-5.9.3.0-018R.img, NX7500-LEAN-5.9.3.0-018R.img
NX 5500	NX5500-5.9.3.0-018R.img, NX5500-LEAN-5.9.3.0-018R.img

Virtual Platform	Firmware Image
VX 9000 <sup>1</sup> —production iso/img image	VX9000-INSTALL-5.9.3.0-018R.iso, VX9000-5.9.3.0-018R.img, VX9000-LEAN-5.9.3.0-018R.img
VX 9000 – demo iso image	VX9000-DEMO-INSTALL-5.9.3.0-018R.iso <sup>2</sup>

<sup>1</sup>VX 9000 image has default 64 AP license starting WiNG 5.8.3.

<sup>2</sup>The VX demo image is a 60-day trial image of the VX 9000 software VM that can be used for demos and in the lab environments. This image does not need any additional licenses; it comes with 16 AAP licenses built-in. There is no migration from the demo image to the production image.

AP Platforms	Firmware Image
AP 6522 / AP 6522E	AP6522-5.9.3.0-018R.img AP6522-LEAN-5.9.3.0-018R.img (included in all Controller images)
AP 6562 / AP 6562E	AP6562-5.9.3.0-018R.img AP6562-LEAN-5.9.3.0-018R.img (included in all Controller images)
AP7161	AP7161-5.9.3.0-018R.img AP7161-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7532	AP7532-5.9.3.0-018R.img AP7532-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7522/AP 7522E	AP7522-5.9.3.0-018R.img AP7522-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7562	AP7562-5.9.3.0-018R.img AP7562-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7502 / AP 7502E	AP7502-5.9.3.0-018R.img AP7502-LEAN-5.9.3.0-018R.img (included in all NX controller images)

AP Platforms	Firmware Image
AP 8163	AP8163-5.9.3.0-018R.img AP8163-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 8533	AP8533-5.9.3.0-018R.img AP8533-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 8432	AP8432-5.9.3.0-018R.img AP8432-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7602	AP7602-5.9.3.0-018R.img AP7602-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7622	AP7622-5.9.3.0-018R.img AP7622-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7612	AP7612-5.9.3.0-018R.img AP7612-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7632	AP7632-5.9.3.0-018R.img AP7632-LEAN-5.9.3.0-018R.img (included in all NX controller images)
AP 7662	AP7662-5.9.3.0-018R.img AP7662-LEAN-5.9.3.0-018R.img (included in all NX controller images)

## 2. NEW FEATURES IN WING 5.9.3

### NSight REST API

WiNG 5.9.3 provides support for REST APIs to the NSight Application Platform. Following are the category of APIs supported:

- **Statistics APIs:** Fetch statistics data from the most-recent (raw) data bucket of NSight database. These statistics are related to AP statistics, Wireless statistics, Application Visibility statistics and resource (CPU, etc) details.
- **Alarms APIs:** Fetch Alarms from the NSight Alarms portal. **Note:** Configuration and scheduling APIs for Alarms is not available in this release.
- **Reports APIs:** Configure, schedule reports and send the generated reports over email or store locally on the server.

### WiNG REST API

WiNG 5.9.3 extends WiNG API framework to support the following new set of APIs.

- **Device-upgrade APIs:**  
 Load device-upgrade images on self, remote device and rf-domain manager.  
 Show loaded device-upgrade images on self, remote device and rf-domain manager.  
 Show image loading status  
 Trigger upgrade on - all adopted devices, selected by device-type, hostname, hostname substring.  
 Trigger upgrade on rf-domain- all, name, name substring, location
- **Upgrade API**  
 Firmware upgrade on same device or remote device or on rf-domain. Image location can be specified as URL or DHCP vendor options be used.  
 Show DHCP vendor options received from DHCP server.
- **Show command APIs:**

Show message logs in the system.  
Show event-history  
Show Captive Portal sessions and statistics  
Show L2TPv3 / L2GRE tunnel information.  
Show radio statistics  
Show wireless APs in an RF-domain.  
Show CDP and LLDP neighbor details.

➤ **Wireless Client APIs:**

Disconnect wireless client by mac address or all mac-addresses on self, remote device or rf-domain, along with filter for WLAN.

➤ **BLE Receive APIs:**

Send MAC, RSSI (and any other sensor data) for all BLE devices seen in the network (Asset Tracking). Streams API data to a configured 3rd party server or ExtremeLocation Service.

### Wireless features

- **Receive sensitivity reduction** - allows to reduce the cell size by essentially reducing AP receive sensitivity to interference and noise and can, effectively, reduce channel utilization in outdoor deployments.  
**Feature supported on AP 7522, 7532, 7562, 8533 and 8432.**
- **VMM support for AP 7662.**
- **SA (Spectrum Analysis) support for AP 7612, 7632, 7662 sensors.**

### Wired features

#### L2TPv3 Tunnel monitoring

Adds event/trap, along with site name, to notify tunnel status change (setup, reestablishing, etc)

**Note:** notification feature only works for the tunnels established between WiNG devices.

### ExtremeLocation Enhancements

WiNG 5.9.3 adds support for BLE in receive mode operation. Sends MAC, RSSI (and any other sensor data) for all BLE devices seen in the network (Asset Tracking, etc). Streams API data to a configured ExtremeLocation Service.

### Additional Enhancements

- Add SFTP support for 'remote-debug' command.
- ESL – SoluM support for AP 8432

SoluM ESL (Electronic Shelf Label) uses small battery powered tags to display pricing, product information that can be modified on-demand through a Gateway device – running on a USB dongle. WiNG 5.9.3 adds support for SoluM USB dongle Gateway integration with AP 8432.

Note: USB interface for SoluM only support VLAN 1 and Unicast DHCP offer.

### Regulatory Updates

- **Tunisia SKU** release AP-7632-680B30-TN - Tunisia Regulatory requires country code on the Aps shipped to Tunisia will be locked and no other country code can be configured to ensure Tunisia Regulatory compliance. Aps shipped to Tunisia will still be WR SKU but there will no possibility to change a country code unless AP is reimaged completely.

- **Indonesia** update - Conducted power reduced to 100Mw to comply with Indonesia regulatory. Update applied to all supported AP modes;
- **Colombia** update – applicable to all supported AP modes
  - Colombia need to follow FCC rules and both countries can only be configured on US SKU Aps.
  - Existing AP installations are not impacted and both country codes can still be configured on WR SKU as well.
- WiNG 5.9.3 adds support for **Myanmar** country code for all supported AP models.

### 3. GENERAL INFORMATION FOR FIRMWARE UPGRADE / DOWNGRADE

#### 3.1 Device Upgrade/Downgrade matrix

This section documents allowed upgrade/ downgrade combinations. Please ensure that the controller and AP are on the same WiNG version after the upgrade is complete in the controller deployment.

**Note:** All Motorola branded software (below v5.7.0.0 with exception of v5.5.6.0) is not available for download through Support Portal at this point.

Adaptive with the RFS controller	Upgrade from	Downgrade to	Notes
AP 6522	v5.4 onwards	v5.4 onwards	AP 6522 image is contained within the controller image
AP 6562	v5.4.4 onwards	v5.4.4 onwards	AP 6562 image is contained within the controller image
AP 7161	v5.1.1, v5.1.4, v5.2 onwards	v5.1.1, v5.1.4, v5.2 onwards	
AP 7502	v5.5.4.1 onwards, excluding v5.6.x	v5.5.4.1 onwards, excluding v5.6.x	AP image is contained within the NX controller image
AP 7532/AP 7522	v5.5.3.1 onwards, excluding v5.6.x	v5.5.3.1 onwards, excluding v5.6.x	AP image is contained within the NX controller image
AP 7562	v5.7.1 onwards	v5.7.1 onwards	AP image is contained within the NX controller image
AP 7602/7622	v5.8.4.20, v5.8.4.21, 5.9.1	v5.8.4.20/5.8.4.21	v5.8.4.20/5.8.4.21 was limited release. AP image is contained within the NX controller image
AP 7612/7632/7662	v5.9.1	v5.9.1	AP image is contained within the NX controller image.
AP 8163	v5.6 onwards	v5.6 onwards	AP 8163 images are not within the controller image

Adaptive with the RFS controller	Upgrade from	Downgrade to	Notes
AP 8533/ AP 8432	v5.8.4 onwards	v5.8.4 onwards	AP image is contained within the NX controller image.
RFS 4000	v5.0 onwards	V5.0 onwards	
NX 5500	v5.8 onwards	v5.8 onwards	NX 5500 is supported starting with v5.8
NX 75XX	v5.5.2 onwards	v5.5.2 onwards	Note: WiNG 5.6 doesn't support NX 7500.
NX 9500	v5.2.1 onwards	v5.2.1 onwards	
NX 9510	v5.4.1 onwards	v5.4.1 onwards	
NX 96XX	v5.5.6 onwards	v5.5.6 onwards	NX 96XX is not supported with v5.6.x and v5.7.x
VX + all supported APs	v5.6 onwards	v5.6 onwards	

### 3.2 Device Upgrade/Downgrade Procedure

#### IMPORTANT:

- Always create config back-up before the upgrade.
  - Firmware upgrades can take several minutes; aborting an update by removing power may damage the AP or controller. Please allow time for devices to complete the upgrade. Where APs are powered through PoE connections to WLAN controllers, the controller needs to stay up during the upgrade process.
  - Both the controller and the AP should be upgraded to the same versions – a firmware mismatch can cause network disruptions and should be avoided. When upgrading, the controllers should be upgraded first and then the APs. When downgrading, the APs should be downgraded first, and then the controller.
1. Copy firmware image for device that needs to be upgraded to you ftp/tftp server. Refer to section 2 for correct firmware image for your device.
  2. Use the **—upgrade ftp://<username>:<password>@<ip address of server>/<name of file>**, or **—upgrade tftp://<ip address of server>/<name of file>** command from CLI or **Switch->Firmware->Update Firmware** option from the GUI. You may need to specify the username and password for your ftp server.
  3. Restart the device. From CLI the command is **—reload**.

### 3.3 AutoInstall

AutoInstall in WiNG 5 works via the DHCP server. This requires the definition of Vendor Class and three sub-options that can be either sent separately or under option 43:

Option 186 - defines the tftp/ftp server and ftp username, password information (IP address and protocol need to enter as a string: **—ftp://admin:admin123@192.168.1.10||**)

Option 187 - defines the firmware path and file name

Option 188 - defines the config path and file name

Autoinstall of firmware and autoinstall of configuration can be enabled or disabled. Ensure to enable “ip dhcp client request options all” on the VLAN interface which is being used to perform the above autoinstall.

DHCP vendor class for platforms is noted below:

Appliances:

- WingRFS.RFS4010
- WingNX.NX5500
- WingNX.NX7500
- WingNX.NX9000
- WingNX.VX

AP:

- WingAP.AP6522
- WingAP.AP6562
- WingAP.AP7161
- WingAP.AP8163
- WingAP.AP7502
- WingAP.AP7522
- WingAP.AP7532
- WingAP.AP7562
- WingAP.AP7602
- WingAP.AP7612
- WingAP.AP7632
- WngAP.AP7622
- WingAP.AP8533
- WingAP.AP8432
- WingAP.AP7662

## a. General Important Notes on Upgrade / Downgrade

2. Upgrading AP 7602/7622 from WiNG 5.8.4.20 to WiNG 5.9.1 or later – requires upgrade to WiNG 5.8.4.21 first.
3. WiNG 5.9.0 release extends the number of DNS ACL rules support from 10 to 64. When downgrading the AP from v5.9.0 to a prior release, all DNS ACL rules are forcefully removed to maintain backward compatibility. User needs to re-configure the DNS ACL rules after the downgrade.
4. WiNG 5.9.0 enables support to configure EU country codes on WR SKU.
5. Application Visibility / DPI Engine – Downgrading to an older version from WiNG 5.9.0 will lead to loss of configuration that contains new application and protocol names introduced with the new DPI engine in WiNG 5.9.0. Configuration containing application and/or protocol names that are available in both WiNG 5.9.0 and prior versions will be preserved upon downgrade.
6. If using SNMP alias password in WiNG 5.8.6 and need to downgrade to prior versions, first remove new SNMP configuration.
7. WiNG 5.8.4 introduced NTP Server string alias configuration. When downgrading from 5.8.4 or above to an earlier WiNG release and NTP server string alias is configured, for example:  

```
alias string $NTP-HOST <string>
ntp server NTP-HOST
```

  
the string alias configuration needs to be removed before going through the downgrade operation:  

```
no ntp server $NTP-HOST
no alias string $NTP-HOST <string>
commit write
```
8. With WiNG 5.8.4, the length of logout FQDN and localization FQDN configuration in captive portal has changed from 256 to 128 characters. When upgrading to WiNG 5.8.4 or above from previous releases, if the logout and/or localization FQDN is longer than 128, then a reconfiguration with lower character length is required.
9. WiNG 5.8.4 introduced ‘vlan’ keyword to the DNS critical resource-monitoring configuration. When upgrading to 5.8.4 or above from an earlier WiNG release and DNS critical resource-monitoring is configured, for example:  

```
critical-resource dn monitor-using-flows any dns A.B.C.D/M
```



the DNS critical resource-monitoring configuration needs to be removed before going through the upgrade and reconfigured with the 'vlan' option after the upgrade:

*critical-resource dn monitor-using-flows any dns vlan <1-4094> | A.B.C.D/M*

10. DHCP Vendor Class changes:

DHCP Vendor Class Identifier has been changed in WiNG 5.7.1 and later to use "Wing", e.g. WingAP.AP7532, WingAP8132, WingRFS.RFS4000 and etc.

Note: DHCP vendor class should be modified on DHCP servers prior to upgrading APs.

11. When downgrading from WiNG 5.7.2 (or newer) to WiNG 5.7.1 (or older), the SNMP trap host configuration will need to be re-applied due to the newly introduced encrypted community string option.

v5.7.2 (or newer):

*(config-management-policy-default)#snmp-server host 1.1.1.1 v2c community ?*

a. Enter a clear text trap community name

b. Enter an encrypted trap community name

*WORD Enter Trap Community Name*

v5.7.1 (or older):

*(config-management-policy-default)#snmp-server host 1.1.1.1 v2c community ?*

*WORD Enter Trap Community Name*

12. Due to upgrade of radius module in WiNG 5.9.2 – if you have Onboard-Radius Server with LDAP Authentication, please note the following:

Configurations using "(sAMAccountName=%{Stripped-User-Name})" need to be updated to "(sAMAccountName=%{Stripped-User-Name}:%{User-Name})" prior to performing the upgrade process.

For WiNG 5.7.1 till WiNG 5.9.1 when running Onboard-Radius Server with LDAP Authentication configured, following was required:

Configurations using "(sAMAccountName=%{Stripped-User-Name}:%{User-Name})" need to be updated to "(sAMAccountName=%{Stripped-User-Name})" prior to performing the upgrade process.

13. When downgrading from WiNG 5.8.x to a version prior to WiNG 5.4.x through rf-domain, the user needs to downgrade without reloading APs and then do a manual reload on the rf-domain. The following are the CLI commands for this procedure:

*device-upgrade rf-domain <RF domain name> all no-reboot ...* this downgrades all APs (including the RF domain manager) without rebooting them

*reload on <RF domain name> ...* this reboots the entire RF domain.

Staggered reboot option is not supported in this downgrade scenario.

14. Controller adopting/upgrading large number of Aps simultaneously - it's recommended to reduce number of events forwarded to the controller during upgrade/adoption – especially client specific events.

## **4. FIRMWARE UPGRADE / DOWNGRADE – CONTROLLERS**

### **4.1 Platform Important notes**

1. VX 9000:



- a. Secondary storage: VX 9000 has disk size limitation on the default disk of 2TB. However, when a secondary virtual disk is used, VX 9000 can support disks size larger than 2TB
    - Enabling secondary storage does not copy data files to the new location
    - It is recommended immediately after provisioning the guest instance, before enabling NSight or Captive-Portal
    - If the secondary storage needs to be enabled after NSight/Captive-portal, it is recommended to back up the database, and restore the database after secondary storage is enabled.
    - If the VX 9000 instance is not a primary (replica-set member), the database server will perform full data sync after it is restarted with the new secondary storage disk.
  - b. VX 9000 requires re-install using the VX9000-INSTALL-5.8.2.0-030R.ISO image if the user intends to configure NSight / Captive portal functionality. This is due to the changes to the flash partition (25% of the allocated disk size – 4GBMin, 128GB Max) to take effect:
    - Export configuration before reinstalling the VX.
    - To preserve the same MAC address (and therefore the serial number for licensing)
      - Delete current hard disk from the VM
      - Add new virtual hard disk
      - Connect ISO file as virtual CD
      - Boot into CD to start installation processAfter installation is complete, restore the configuration.
2. NX 9600:
    - a. WiNG 5.8.6 introduced support for new RAID controller for NX 9600 platform. For platforms shipping with new RAID – downgrade below v5.8.6 will be disallowed.
    - b. WiNG 5.8.1 changed default RAID configuration for NX 9600 from RAID 5 to RAID 10 to improve performance. Note: RAID configuration cannot be changed upon upgrade or downgrade.  
NX 9600 controllers manufactured with v5.8.1 or above will have RAID 10 configured. NX 9600 controllers manufactured with v5.5.6 will have RAID 5 configured. RAID configuration can only be changed by authorized personnel.
  3. RFS 4000:
    - a. When downgrading an RFS 4000 from WiNG 5.8 to WiNG 5.7, the user first needs to downgrade the RFS 4000 to WiNG 5.7.2 before moving to WiNG 5.7.
  4. When upgrading from prior versions – new profiles for newly supported platforms will not be present in the startup-config. The user can either create a default profile or do “erase startup-config”.

## 4.2 Device Upgrade Options

WiNG 5.x supports device firmware upgrade from the controller. For firmware upgrade through the controller, firmware image needs to be loaded onto a controller and the same can be used for the upgrade of all the corresponding devices.

Available firmware on the controller can be checked using the below command:  
`nx9600#show device-upgrade versions`

If device firmware is not part of controller image, a new image can be uploaded using the following command:

*nx9600#device-upgrade load-image*

Once device firmware is loaded on the controller, below are the different options that are available for device firmware upgrade:

- **Manual Upgrade**

Firmware upgrade can be initiated on a single or a list of Aps using the below command.

*nx9600#device-upgrade ap7532 ?*

*no-reboot*      *No reboot (manually reboot after the upgrade)*

*reboot-time*      *Schedule a reboot time*

*upgrade-time*      *Schedule an upgrade time*

*nx9600#device-upgrade ap7532 all ?*

*force*              *Force upgrade on all devices*

*no-reboot*      *No reboot (manually reboot after the upgrade)*

*reboot-time*      *Schedule a reboot time*

*staggered-reboot*      *Reboot one at a time without network being hit*

*upgrade-time*      *Schedule an upgrade time*

- **Scheduling Firmware upgrade**

Firmware upgrade can be scheduled on a controller, that is upgrade time and reboot time can be configured. Firmware upgrade on the Aps follows the configured upgrade time.

*nx9600# device-upgrade all ?*

*no-reboot*      *No reboot (manually reboot after the upgrade)*

*reboot-time*      *Schedule a reboot time*

*staggered-reboot*      *Reboot one at a time without network being hit*

*upgrade-time*      *Schedule an upgrade time*

- **Upgrade through RF Domain manager**

Manual Firmware upgrade can be initiated through a domain manager

*nx9600#device-upgrade rf-domain ?*

*DOMAIN-NAME*      *RF-Domain name*

*all*                  *Upgrade all RF Domains*

*containing*      *Specify domains that contain a sub-string in the domain name*

*filter*              *Specify additional selection filter*

## 4.3 Auto Upgrade

Auto firmware upgrade can be enabled on the controller using the below command. When enabled, any AP with a firmware version different than the controller will be upgraded to the controller's version on adoption.

*nx9600 (config-device-XXX)# device-upgrade auto*

The number of concurrent firmware upgrades can be configured using the below command based on the bandwidth available between the controller and the Aps.

*nx9600(config-device-XXX)# device-upgrade count ?*

*<1-20>*      *Number of concurrent AP upgrades*

**Note:** Auto upgrade on the APs always happens through the controller.

## 5. FIRMWARE UPGRADE/DOWNGRADE – INDEPENDENT APS

### 5.1 Platform Important Notes on Upgrade / Downgrade

1. AP 8533/AP 8432:

- a. AP 8533/8432 manufactured with v5.8.4 or above cannot be downgraded to v5.8.3.
  - b. When upgrading AP 8533 running v5.8.3.x to v5.8.6, please upgrade to v5.8.4 first and then to v5.8.6.
2. AP 7532/AP 7522/AP 7562:
  - a. AP 7522, AP 7532, and AP 7562 manufactured after July 2017 use new NAND chipset. Downgrading to a release prior to WiNG 5.8.0 will render these units irrecoverable. Please refer field flash “FN-417 – AP 7522, AP 7532, AP 7562 Component Change” for the affected hardware revision and software downgrade version restrictions.
  - b. When downgrading from WiNG 5.8 to WiNG 5.5.5 or WiNG 5.5.4 on AP 7532/7522, the user needs to apply kernel patch **AP75XX-CPU-Bringup-1.0.patch**. AP7532/AP7522 running WiNG 5.5.6/5.7.x has an updated kernel version and the patch is required when the AP downgrades to a firmware with a prior kernel version. Steps to apply the patch:
    - Copy AP75XX-CPU-Bringup-1.0.patch to your tftp server.
    - Apply the patch using upgrade command:
      - “upgrade tftp://<server ip address >/AP75XX-CPU-Bringup-1.0.patch”
    - Use “boot system primary” or “boot system secondary” based on the WiNG 5.5.5/5.5.4 image location on the AP and reload.
3. AP 8XXX:
  - a. WiNG 5.8.1 added support for new NAND chipset for AP 8122, AP 8132, AP 8163, AP 8222 and AP 8232. APs manufactured with new NAND cannot be downgraded to the prior version.
  - b. WiNG 5.5.2 added support for new NAND for AP 8XXX platforms. Downgrade to prior releases on hardware with new NAND will be prevented.
4. AP 7161:
  - a. WiNG 5.1.4 added support for the new NAND for AP 7161. Hardware revs with the new NAND will be unable to downgrade below these versions or version 4.1.5 – as these support the new NAND, but previous versions do not.

## 6. UPGRADE / DOWNGRADE - NSIGHT

### 6.1 Important Notes on Upgrade – NSight

1. Upgrading from WiNG 5.8.2 and upwards - NSight
  - a. Upgrade all devices to new firmware using the upgrade command. DO NOT reboot the devices.
  - b. Reboot the Arbiter and wait for the device to come up and join the replica-set.
  - c. Disable NSight-server on primary replica-set member:
    - Primary #self*
    - Enter configuration commands, one per line. End with CNTL/Z.*
    - Primary (config-device-00-0C-29-35-AE-F6)#no use nsight-policy*
    - Primary (config-device-00-0C-29-35-AE-F6)#comm wr*
    - Primary (config-device-00-0C-29-35-AE-F6)#end*

- d. Reboot the primary replica-set member and wait for the device to come up and join the replica-set. Make sure that the replica-set is up. Use the below-mentioned command to verify:

*Primary#sh database status*

<i>MEMBER</i>	<i>STATE</i>	<i>ONLINE TIME</i>
<i>192.168.210.200*</i>	<i>PRIMARY</i>	<i>0 hours 2 min 17 sec</i>
<i>192.168.210.201</i>	<i>SECONDARY</i>	<i>15 hours 15 min 53 sec</i>
<i>192.168.210.203</i>	<i>ARBITER</i>	<i>15 hours 47 min 16 sec</i>

*[\*] indicates this device.*

- e. Enable NSight-server on primary replica-set member:

*Primary #self*

*Enter configuration commands, one per line. End with CNTL/Z.*

*Primary (config-device-00-0C-29-35-AE-F6)#use nsight-policy <nsight-policy>*

*Primary (config-device-00-0C-29-35-AE-F6)#comm wr*

*Primary (config-device-00-0C-29-35-AE-F6)#end*

- f. Repeat steps ( c ) to ( e ) for Secondary member of replica-set.

## 2. Upgrading from 5.8.0/5.8.1 to WiNG 5.8.2 or later

The database file definitions for NSight and Captive Portal in WiNG 5.8.2 have been changed:

- There is no portability of NSight data from the earlier versions (WiNG 5.8.0 and WiNG 5.8.1). In the case of needing to downgrade to WiNG 5.8.0 or WiNG 5.8.1, the user must do a database backup before upgrading to WiNG 5.8.2 or later.
- For Captive Portal data, the user must do a database backup (export using JSON format) from the earlier versions (WiNG 5.8.0 and WiNG 5.8.1) before upgrading to WiNG 5.8.2, and can be imported after the upgrade.

The following are upgrade steps for NX 7500, NX 9500 and NX 9600 (please refer WiNG 5.8.1 notes and ensure NX 9600 is configured for RAID10):

- Load WiNG 5.8.2 or later image on to the device using upgrade and reload commands:
- After the device reloaded and prompt appears, execute the following commands. The device will reload after the last command:

*service database server stop*

*service database remove-all-files*

*All database files will be removed, do you want to continue? (y/n): y*

VX 9000 requires re-install using the VX9000-INSTALL-5.9.3.0-018R.ISO image due to changes to the flash partition (25% of the allocated disk size – 4GBMin, 128GB Max) to take effect:

- Export configuration before reinstalling the VX.
- To preserve the same MAC address (and therefore the serial number for licensing)
  - Delete current hard disk from the VM
  - Add new virtual hard disk
  - Connect ISO file as virtual CD
  - Boot into CD to start installation process
  - After installation is complete, restore configuration from backup

### 6.3 Important Notes on Downgrade – NSight

1. When downgrading from WiNG 5.8.4 to earlier versions of WiNG and a database replica-set is configured, the replica-set configuration must be removed before downgrading on all members of the replica-set.
  - On each member of the replica-set, remove the database-policy
    - self*
    - no use database-policy*
    - commit write*
  - Commit the changes. Once ‘show database status’ on all the devices show database is not enabled, reload each device into the new downgraded version.
  - After the devices reload, reapply the database-policy with the replica-set configuration to bring up the replica-set
    - self*
    - use database-policy <replicat-set>*
    - commit write*
2. When downgrading from WiNG 5.8.2 to prior versions, following are the downgrade steps needed for NX 7500 (for Captive Portal), NX 9500, NX 9600 and VX 9000, if NSight or Captive portal are enabled
  - Backup the database for any future use
  - Load the required image version on to the device using upgrade and additional commands listed below:
    - upgrade tftp://<server-ip-address>/<filename>*
    - no use nsight-policy (Needed only if NSight was enabled)*
    - commit write*
    - service database server stop*
    - service database remove-all-files*
    - All database files will be removed; do you want to continue? (y/n): y*
  - After the device reloads, restore the captive portal database, and the device is ready for deployment.

## 7. IMPORTANT NOTES

### New in v5.9.3

1. Application Visibility DPI engine on the supported APs upgraded to a newer version 18.07.06. As a result – some application names have been deprecated and new application signatures were added.
2. Chrome v67 and above, automatically redirects traffic sent to 1.1.1.1 to Cloudflare, which is a new service offering DNS over HTTPS.  
Many captive portal vendors, including WiNG, use 1.1.1.1 as an internal redirection IP/hostname for guest network splash pages. It's best practices to update Captive Portal Server hostname to make sure that process is working correctly
3. BLE: The current default power is set such that user can detect BLE beacons at distance up to 30'. The user may have to reduce the TX power for their use-case, e.g. micro-locationing. Note that the TX power setting is not the power in dBm, but only an index that follows a logarithmic relation to the output power in dBm.
4. AP 7632 BLE radio doesn't support “mode bt-sensor” – mode needs to be changed to “mode le-beacon”.
5. Mixed version deployment:

- When NX controllers has firmware version 5.9.1.x version, configuration push to AP running WiNG 5.9.2.x might throw the following/similar error message.

```
USER-3-ERR: main.pyo: Feb 23 18:50:57 2018: %USER-3-ERR: main.pyo: * * ERROR:
4 - commit unknown exception - object of type 'Lacp_Cfg' has no len() Feb 23
18:50:57 2018: %USER-3-ERR: main.pyo: * * ERROR: update own config failed
```

To address this issue – CfgdLacpUpdate.patch needs to be installed on controllers running WING 5.9.1.x versions. Patch can be obtained thru Extreme Support.

- Roaming – credential cache update message is not compatible between WiNG 5.9.2 and earlier versions. To mitigate that – new command is added at rf-domain level, which is disabled by default. When enabled it will only send the old cred cache message to the neighbor devices. New command can only be configured if controller running WiNG 5.9.2.4 version or above.

```
ap7532-1A1B18(config-rf-domain-default)#service cred-cache ?
legacy-compatible Force use legacy credential cache format when mixed
versions are deployed
```

6. This release provides SMART-RF backwards compatibility between WiNG 5.9.2 and earlier versions.

The scenarios that are supported are the following:

- RF Domain manager running WiNG 5.9.2.4 or above with mix of 5.9.2.4 and 5.9.1.x APs with the Select Shutdown feature enabled
  - Expected behavior:
    - WiNG 5.9.2.4 APs will operate with select-shutdown feature enabled
    - WiNG 5.9.1.x APs will operate normal to WiNG 5.9.1 with no select-shutdown feature.
- RF Domain manager running WiNG 5.9.2.4 or above with mix of 5.9.2.4 and 5.9.1.x APs with the Select Shutdown feature disabled
  - Expected behavior:
    - All APs will operate normal to WiNG 5.9.1 with no select-shutdown feature.

Having device running WiNG 5.9.1 as an RF Domain manager with other Aps running WiNG 5.9.2.4 is not supported and the behavior is not defined.

Controller-managed rf-domains:

- all domains need to have smart-rf policy mapped if select-shutdown needs to be enabled/disabled properly.
- Select-shutdown feature needs to have the same value (either enable or disable) for all smart-rf policies used by the controller.

7. smart-rf coverage-hole-recovery and rx-sensitivity-threshold cannot enable at the same time, otherwise coverage-hole-recovery will not work correctly.

#### 8. Remote-debug using sftp mode:

- The remote-debug copy-techsupport will not be able to run on "self" host. If the "self" device is included in the rf-domain when running reug copy-techsupport, then self-host will be excluded if sftp is used to copy.
- When capturing large data with remote-debug in sftp mode, the device may run out of space and will not be able to copy all the data. If this is noticed, please use area, floor, count filters to minimize the number of devices and the size

## 9. Fabric Attach

When FA is used in Untagged Management mode, User must configure TRUNK port and configure VLAN 1 as the NATIVE VLAN.

Edge switch port might belong to VLAN-X, and while configuring FA mapping User should configure like below, "Y" is the WLAN vlan and "Z" is the corresponding ISID

```
interface ge1
switchport mode trunk
switchport trunk allowed vlan 1, Y
switchport trunk native vlan 1
switchport trunk fabric-attach vlan Y isid Z
```

## 10. New CLI commands added:

- Location server status  
show wireless location-server ?  
on On AP/Controller  
| Output modifiers  
> Output redirection  
>> Output redirection appending  
<cr>
- Trustpoint point CB changes:  
Changed the CLI 'show wireless bridge certificate status' to 'show wireless bridge client-certificate status'  
Added New CLI 'show wireless bridge ca-certificate status' to check the ca trustpoint status.
- BSSID added to "show wireless radio detail"
- New CLI option under "crypto remote-vpn-client" to control the reauthentication behavior upon IKE rekey.  
crypto remote-vpn-client  
[no] ikev2 peer reauth  
If 'ikev2 peer reauth' is disabled, then IPSec SA's will not be re-created upon IKE rekey.
- New CLI for server configuration in imagotag policy  
(config-iot-device-type-imagotag-policy-test)#server ?  
hostname Server hostname. It can be FQDN, partial DN or any.  
ip-address Server IP address



- New AP 8432 CLI configuration option to control the USB port power state. The new option 'usb-enable' is available under the 'power-config' command. The default value is "enable".  
(config-device-12-34-56-12-34-56)#power-config usb-enable  
(config-device-12-34-56-12-34-56)#no power-config usb-enable

## **New in v5.9.2**

### **1. New CLI Commands added**

- New command: "**show snmpv3 engineID**" to allow reading snmp engineID of the device.
- In reload command added option "all" to reload devices in all rf-domains:  
Reload [|staggered] on <rf-domain-name|all> [|containing <substring> |filter <device-type> |exclude-controllers|exclude-rf-domain-manager]
- Added new functionality to switch boot partition on devices from controller. It is available over rf-domain.  
**boot system (active | inactive) [on (device <mac|hostname> | rf-domain <name>)]**  
The option active will check if the current boot is primary or secondary and will change next boot to the current boot. Inactive will do the exact opposite.
- Add CLI command and update device config schema to configure the hello-interval and adjacency-hold-time of cluster MiNT links:  
**cluster hello-interval <1-120> adjacency-hold-time <2-600>**
- Command "**802.11v bss-transition**" under WLAN context is not hidden anymore.
- CLI command to force preemption of L2TPV2 tunnel back to primary:  
"**<no> preempt [|delay <60-600>]**"

### **2. ExtremeGuest:**

- VX9000 based ExtremeGuest application is not supported with WiNG 5.9.2.
- Use UpgradeVX9000ToEGuest.patch to migrate the VX9000 based ExtremeGuest application to ExtremeGuest 5.9.2 release.
- License Management for ExtremeGuest is only available at User Interface, CLI based license management is not supported.
- ExtremeGuest user interface is accessible through  
http(s)://hostname.domainname.com/
- Set WLAN registration type as "user" when setting up onboarding policy for the network to deliver One-Time-Passcode/Passcode on sponsor approval.
- Enable Message Parts at Clickatell SMS integration when customized SMS text message exceeds 160 characters length.
- Device fingerprinting report may not provide accurate Device, Browser and OS types when using Frictionless Onboarding for a network.
- Following ExtremeGuest functionalities are not supported for Captive-Portal Gateway Deployment
  - Frictionless Onboarding
  - Loyalty Application detection
  - Disconnect from network
  - Welcome Back Message

### **3. ADSP incompatibility:**

**Due to 3<sup>rd</sup> party module upgrade in WiNG 5.9.2 (openssl, openssh and others) – there is incompatibility between WING 5.9.2 and ADSP 9.5. Following ADSP features are impacted:**

- Manual Data poll. Auto data poll/collection also fails, but ADSP gets required data for sanctioning BSS and clients by then.
- Readiness Test
- Command run and log
- Firmware upgrade downgrade from ADSP for AP and sensor.
- Configuration Compliance check(Audit) and enable auto-correction
- Configuration push

**ADSP 10.0 release should address this incompatibility.**

#### 4. Fabric Attach

When the WiNG devices connected to an FA enabled edge switch, the device would auto-learn interface configuration from the edge switch. That means, the WiNG device would auto-configure the VLAN on that interface supplied from the edge switch. The edge switch may mark/unmark the VLAN for tagging and this would reflect in the interface configuration of the WiNG device.

The auto-configure would be local to the AP/Controller and would not be supposed to persist the reboot. It is recommended to have “no auto-learn staging-config” configured on adoption controller. Controller should have the AP’s interface configuration pre-configure at Profile level; otherwise controller would override the AP’s configuration and AP may lost connectivity to controller.

Default LLDP TX timer is 60 seconds. i.e LLDP sends out packet on every 60 seconds and this applies to FA messages as well. Whereas VSP/ERS switches’ default Element TLV timeout is 40 seconds. So, this might cause the FA switch to complain about Element TLV timeout. One may configure AP/Controller’s LLDP timer less than 40s to overcome this issue – under profile/device “lldp timer <5-900>”.

#### 5. Imagotag support

- AP’s IP address and AP-ID needs to be configured in ESL server for communication between ESL communicator (USB dongle) and ESL server.
- AP-ID can be determined by “show iot-device-type-imagotag status” command.
- If after configuration of AP’s IP and AP-ID in ESL server, AP’s IP is changed (statically or via DHCP), the AP needs to be reconfigured again as per #1.
- AP-ID is saved in a file on AP after imago policy configuration so that same AP-ID is used by after reboots, however if a DD install is done on AP, this file will be erased and AP needs to be configured again with new AP-ID as per #1.
- USB dongle has a color led which has following connotations –
  - a. Red – no userspace process (thinAP2) is controlling dongle; probable causes may be,
    - i. No policy configured
    - ii. IP address and/or AP-ID of AP is changed
  - b. Ember – communication between ESL server and userspace process (thinAP2) is getting established.
  - c. Blue – communication between ESL server and userspace process (thinAP2) is established.

#### 6. Following features are now supported on AP 7612/7632/7662 in this release:

- a. RSSI locationing
- b. L3 Mobility
- c. PPOE, VRRP, OSPF, MSTP

- d. 802.1x authentication on ge port
7. Following features are now supported on AP 76027622 in this release:
- a. RSSI locationing
  - b. 802.1x authentication on ge port.
  - c. Radius VSA
  - d. Role based firewall.

### **New in v5.9.1**

1. Heterogenous AP:
  - a) When using Heterogenous AP management 'anyap' profiles must be used to configure Access Points which are not the same model as the Virtual Controller. These profiles must exist on the Virtual Controller prior to the Virtual Controller adopting and managing other Access Point models. Adoption and management of other Access Point models will succeed without any defined auto provisioning rules if the 'anyap' profiles are named "default-<AP\_MODEL>". For example, an AP 8533 Virtual Controller will successfully adopt and manage an AP 7602 Access Point without an AP 7602 auto provisioning rule if the AP 8533 has an 'anyap' profile named "default-ap7602". Otherwise you will need to create suitable auto provisioning rules for the other Access Point models if you choose to use a different naming convention for your 'anyap' profiles.
  - b) When using Heterogenous AP management be aware that APs operating as Virtual Controllers have much less persistent storage than actual WiNG controllers. Because of this it may not be possible for you to update all APs simultaneously when using multiple AP models. The Virtual Controller may not have enough free persistent storage to hold the firmware update images for multiple AP models. The amount of free persistent storage is unique to every Virtual Controller installation. If your Virtual Controller does not have enough free storage for multiple firmware update files you will need to download a single appropriate firmware update file to the Virtual Controller, update the AP models that correspond to that firmware update file, delete that firmware update file from the Virtual Controller, then repeat the download/update/delete process for the next AP model.
  - c) Only VC AP will have image upload capabilities for upgrade in this release.
2. Added "show adoption status all" command to display adoption on all connected sites.
3. Added the service command "service snmpv3 reset engineID" which will generate the new engineID and reboot the device.
4. WiNG 5.9.1 includes DPI performance improvements.
5. NSight/ExtremeGuest: Added "service show database collections statistics" – to show size of the collection, number of documents.
6. ExtremeGuest: Added "service eguest remove-data deleted-devices|offline-for" to delete the devices reported at ExtremeGuest that are offline/removed from the network.
7. Database Replica Sets - Be aware when using FQDN hostnames for the members of the replica-sets, if a replica set member goes down, DNS queries from the remaining replica set members and database clients can be high for a short period as it tries to resolve (and contact) the missing replica-set member.
8. Configuration command under interface context - "dot1x\_auth\_max\_reauth\_req <1-10>" is changed to "dot1x authenticator max-reauth-count <1-10>".
9. TCP\_RTT metadata collection and reporting is not accurate if enabled.

10. AP 7612/7632/7662 – off channel scans runs only every 30 seconds.
11. NSight: Recurrence reports are not generated as per the schedule once Daylight Savings Time kicks in.
12. Following features are not supported for AP 7612/7632/7662 in this release:
  - a. BLE on AP 7632
  - b. Cisco phones
  - c. Sensor functionality
  - d. MCX and mesh related features
  - e. Client bridge
  - f. MU-MIMO, Transmit beamforming
  - g. L3 mobility
  - h. 3<sup>rd</sup> party locationing
  - i. PPOE
  - j. Keyguard
  - k. GRE, VRRP, OSPF
  - l. WeChat
  - m. NSight – sensor functionality
13. Following features are not supported for AP 7602/7622
  - a. MCX beyond 1 hop mesh
  - b. WIPS functionality beyond what's supported in WiNG 5.8.4.20/5.8.4.21

### **New in v5.9.0**

1. ExtremeGuest: -
  - a. ExtremeGuest Deployment– please refer to “ExtremeGuest Deployment guide” posted on Support site under product manuals.
  - b. ExtremeGuest is supported on VX 9000 instance.  
Note: NX 9600 platform can be used as ExtremeGuest for demo only (non-production).
  - c. Preloaded for 100 client devices/60days without licensing
  - d. Recommended browser when using ExtremeGuest in v5.9.0 are:
    - Chrome – ver 56.0.2924.87 (64-bit) or later.
    - Firefox 53.0.3
  - e. Refer to ExtremeGuest datasheet for the VX resource requirements to deploy ExtremeGuest solution at various scale.
  - f. ExtremeGuest and NSight services are not supported on the same VX instance.
  - g. Splash Template Management – Make sure to add the below command to controller's/VC's before attempting to push the advanced templates from ExtremeGuest to WiNG Controller/Virtual Controller.  
*(config)#rf-domain*  
*(config-rf-domain-{ALL})#override-wlan <WLAN-NAME> template test*  
*\*test – template name has no significance, just a dummy template name.*
  - h. When configuring a database-policy replica-set using FQDN, enable ip dns-server-forwarding on all ExtremeGuest devices participating in the replica set.
  - i. Configure 'geo-coordinates <latitude> <longitude>' in RF domain context to specify site locations for ExtremeGuest Google map view

- j. Configure 'location' in RF domain context to specify Facebook site-id used during Facebook Check-in.
  - k. When enabling wired captive portal based registration with ExtremeGuest, create a dummy wlan '\$location-vlan-VLAN-ID' on the wired device where captive portal is enforced. \$location – value of rf-domain location string.
- 2. Content Caching: No longer support Smart cache feature configurations.
- 3. AP 8432 – DFS channels for Korea country code are enabled.
- 4. WiNG 5.9.0 enables support to send RSSI data feed to ExtremeLocation service. Simultaneous RSSI feed to ADSP and ExtremeLocation services are not supported.
- 5. NSight AVC: –
  - a. NSight widgets may show applications and protocols from previous release in case there is no matching application with new DPI engine.
  - b. New client per app widget – new widget allows user to see the new dashboard which shows app name, number of clients using the app, and throughput usage.
- 6. NSight new alarm - Low or Zero Clients Alarms on Radio. NSight alarm management will raise alarms for a given AP radio when there are no clients associated for 7 days or more.
- 7. NSight client list report includes more details (SNR, RSSI, RX/TX traffic, session-length) in the CSV report.
- 8. WiNG Wired Captive Portal based self-registration and onboarding is supported with ExtremeGuest in external mode (i.e. splash template should be hosted on ExtremeGuest and Captive Portal should be configured with External URLs)
- 9. RF Domain location service commands are now called as 'location-server' instead of 'mpact-server'.
- 10. Adoption – "adoption-mode controller|cloud" configuration option is moved to profile and device-override mode, from rf-domain mode. Upgrade to WiNG 5.9.0 firmware will automatically migrate the configuration to device-override mode.
- 11. Enhanced "show wireless radio statistics rf" command to show channel utilization details.
- 12. WiNG 5.9.0 adds 'ignore-failure' option to device-upgrade staggered command – this option will continue to reboot next set of APs even if one or more APs fail to come back after reboot.
- 13. RTLS: -
  - a. Added support to configure rtl-server-policy parameters from RFS 6000 controller.
  - b. Increased RSSI feed URL length from 64 to 256 characters.
- 14. Enhanced "CLI: "show adoption pending" to show cdp/ldp information of an AP.

#### **New in v5.8.6**

- 1. Recommended browser when using NSight in v5.8.6 are:
  - Chrome – ver 56.0.2924.87 (64-bit) till ver 58.0.3029.110 and from ver 59.0.3071.109 and up.
- 2. In Split VX environment, if the NSight server is rebooted without disabling nsight-policy, it will not be able to establish connection to Mongo and following error is seen:  
*MongoError: Topology is broken.*  
To fix this user needs to disable and then re-enable NSight.
- 3. Default update/data aggregation intervals for NSight has been modified to the following:
  - 1 Minute - 8 Hours
  - 10 Minutes - 1 Month
  - 1 Hour - 6 Months
  - 1 Day - 1 Year

NSight database summary duration 8 720 4320 8760  
wireless client stats update interval to 60 seconds.

Recommended statistics update interval for Aps is no more than 2 minutes. For large deployments – recommended statistics update interval for clients is 5 minutes.

4. When configuring DPI – use DPI capable device as RFDM manager. It's not recommended to use non-DPI capable devices when using this feature.
5. NSight ASA: UI slowness while running ASA and browsing old ASA results  
The slowness of UI is caused due to a large number data points that has to be plotted on the UI in Spectrum Analysis for Spectrogram and Spectral Density charts. Expect approximately 1-minute delay before the plotting begins on the ASA window.  
This limitation, however, is not applicable to Duty Cycle, FFT or Interference charts.
6. When configuring a database-policy replica-set using FQDN, enable ip dns-server-forwarding on all WiNG devices participating in the replica set and the NSight/Guest-Manager application servers.
7. New CLI command for WiNG 5.8.6 to support forwarding of packet types that are not normally forwarded by I2 tunnel broadcast optimization.  
I2-tunnel-forward-additional-packet-types ?  
wnmp Forward WNMP packets across I2 tunnels
8. To form a mesh redundant link - STP packets coming from a mesh port need to be forwarded to wired ports. Prior to WiNG 5.8.6 it was not allowed and blocked by STP. By default, the STP packets destined to bridge group mac address coming from a mesh port was not allowed to cross the bridge. This behavior is changed.
9. AP 8163 – DFS channels for Korea country code are disabled.
10. WiNG 5.8.6 adds ability to use "service reset interface ge", "clear counters interface all", and "clear counters all" on rf-domain level.  
clear counters all on ?  
DEVICE-OR-DOMAIN-NAME AP/Controller/RF-Domain name  
clear counters interface all on ?  
DEVICE-OR-DOMAIN-NAME AP/Controller/RF-Domain name  
service reset interface ge 1 on ?  
DEVICE-OR-DOMAIN-NAME AP/Controller/RF-Domain name
11. WiNG provides new CLI to configure NAS-IP-ADDRESS. User now has control on which IP to set as the NAS-IP-ADDRESS.  
Following command is now part of AAA policy:  
attribute nas-ip-address <IP address>
12. WiNG 5.8.6 adds enhancement to replace device feature added in WiNG 5.8.5 for replacement of old existing device with newly added devices by allowing to add the replacement device first to the configuration.
13. To help user to copy startup configuration from one AP to another WiNG 5.8.6 replaces <device-type self-mac> with "self" in startup-config.

### **New in v5.8.5**

1. WiNG 5.8.5 resolves radio power output issue for AP 7532, 7562 as well as power issue when using 3af power source for AP 8533 and AP 8432.
2. Disallowed configuration of character '/' in the names of tree-nodes for an RF-Domain (i.e. country/region/city/campus names) If one has already configured '/' in the names of tree-

nodes for an RF-Domain (i.e. country/region/city/campus names), then after upgrading the '/' characters in the names of tree-nodes will be replaced by '-' character. The e.g. name "West/Coastal" and "West/Plateau" will be replaced by "West-Coastal" and "West-Plateau". The downgrade will not restore the character '/' back in the names if they were changed during the upgrade. If the customer had enabled NSight while character '/' was present in any of the tree-node name configuration, the customer should drop the database before upgrading to the release containing this change.

3. Adding a new CLI under firewall policy to log all ICMP packets allowed by our firewall.  
firewall-policy fw-default  
logging icmp-all  
default is false (no logging).
4. WiNG 5.8.5 adds ability to configure Mongo DB security. Mongo authentication is controlled by a configurable parameter in the database-policy, with the default case being disabled.
5. Corrected the behavior of radius.  
Fallback is only used when the external LDAP server fails. And not on auth REJECT.  
'authentication data-source ldap fallback'
6. Incorrect LLDP power negotiation with certain Cisco switches on boot up is seen. New CLI configuration "service LLDP tx-init-count" cli added with default count of 3 packets. This will allow sending multiple LLDP packets to allow for correct power negotiation with certain Cisco switches.
7. To prevent gateways being marked as clients - mac-address-table detect-gateways default changed to enabled.

#### **New in v5.8.4**

1. WiNG NSight
  - a. The VX-Split Mongo deployment scale and resource requirements:
    - i. Scales up to 100,000 APs, 1 Million clients, and 2000 RF-domains without AVC metadata (2 minutes' update interval)
      1. NSight-Server (UI): 12 GB RAM, 16 Core, 200GB
      2. NSight-Mongo Server: 384 GB RAM, 24 Core CPU, 4 TB (8000 sustained writes)
    - ii. Scales up to 50,000 APs, 500K Clients and 1000 RF-domains with AVC metadata (1-minute update interval)
      1. NSight-Server (UI): 12 GB RAM, 16 Core, 200GB
      2. NSight-Mongo Server: 256 GB RAM, 24 Core CPU, 4 TB (8000 sustained writes)
  - b. Added configuration 'geo-coordinates <latitude> <longitude>' in RF domain context to specify site locations for NSight Google map view.
  - c. Site wide statistics, for example, Worst sites by RFQI, my present misleading values when of the radios on all APs in the site is disabled.
  - d. Scheduled reports may need to be reconfigured to adjust to the Daylight Savings time switch.
  - e. AVC application statistics collection might miss the last update before roam for a roaming client
2. Captive Portal: WeChat social authentication is supported only in distributed mode. No support for centralized captive portal deployment model.
3. Port description TLV has been added in LLDP packet parsing for 'show lldp' command outputs and can be used in auto-provisioning policy for LLDP-match.



4. Added 'vlan' keyword to the DNS critical resource-monitoring configuration to support dynamically assigned IP addresses.
5. Added an optional 'hide-encrypted-values' parameter to the 'show running-configuration' to display consistent (standard) characters for encrypted strings in the configuration. This facilitates periodic check for changes in configuration by customer monitoring systems.
6. The length of logout FQDN and localization FQDN configuration in captive portal has changed from 256 to 128 characters.
7. AP 8533 and AP 8432 with a manufacturing date before June 28, 2016, does not support MU-MIMO with WiNG 5.8.4 firmware hardware driver.
8. The Bluetooth configuration in AP 81XX profile settings only applies to AP 8132 and not for AP 8122 and AP 8163.
9. AP 7532, AP 7522, AP 7562, AP 8533 and AP 8432 do not support multiple SSIDs per BSSID due to restrictions enforced by the chipset/driver.
10. AP 7532, AP 7522, AP 7562, AP 8533 and AP 8432 require a WLAN is always mapped (no shutdown) to BSS1 for any radio functionality to work properly.
11. Web/Content Filtering is not supported with Tunnel mode configuration.

### **New in v5.8.3**

1. HTTPS connections will use TLS 1.2 ciphers by default. To allow backward compatibility for non TLS 1.2 capable devices to connect– configure in management policy, "no https use-secure-ciphers-only".
2. Added an event log message to report an error condition when an ACL using alias (network, network-group etc) definitions results in expanding to more than 500 rules per ACL. The ACL will not get applied and the following log message is generated (event history/syslog) – "ACL rules exceeded the maximum limit; reduce the rules for ACL to get installed".
3. EX 3500 and T5 adoption running non TLS1.2 compatible versions will need to have "no https use-secure-ciphers-only" configured to get adopted.
4. NSight: In addition to being able to search for a mac-address in the global search box using 11-22-33-44-55-66/11:22:33:44:55:66/112233445566 formats, now a user can search using the Cisco MAC Address format 1122.3344.5566 as well.
5. Added a CLI command in mint global policy to enable/disable the checksum validation for certain mint control packets such as LSP.  
To ensure the integrity of the LSP packets received checksum is added as an optional field.  
[no] lsp checksum
6. The ftp server throttles simultaneous connection from same host to a limit and it is implementation specific. The new CLI can be used to configure the simultaneous connection to a FTP server.  
remote-debug max-ftp-sessions <1-400>  
[no] remote-debug max-ftp-sessions  
device-override remote-debug max-ftp-sessions
7. SSH diffie-hellman-group1-sha1 key exchange algorithm was removed due to this older SSH applications might not work with WiNG 5.8.3 and customer will need to update to use newer more secure versions of SSH clients.

### **New in v5.8.2**

1. Application Visibility

- In bridge-mode tunnel setup where Application Visibility is enabled on the controller, APs will also have to be enabled for application visibility (DPI engine support on the platform is required) for Wireless Client statistics
  - Number of clients and top client information may be missing from certain entries on all application list. This may happen when the application is detected on the wired side or in the case where the usage for this application is very minimal.
2. VX 9000 - Not supported on Amazon instance type C4 due to kernel limitation.
  3. Multi-byte (Chinese Character) SSID
    - Max limit of 64-character length for multi-byte SSID
    - Known limitation with Windows 7 Clients: Available Networks UI display unexpected characters for multi-byte SSID

### **New in v5.8.1**

1. Some mobile devices (Apple) that use LDAP EAP-TLS as primary means of authentication can fail authenticating to WiNG controller. Work-around would be configuring authentication type as PEAP-MSCHAPv2 on the controller when using LDAP.
2. AP7522, AP7532, AP7562, AP8232, AP 8222 and AP7502 do not support multiple SSIDs per BSSID due to restrictions enforced by the chipset/driver.  
WiNG 5.8.1 adds commit time validation for multiple SSIDs per BSS for AP 7522, AP 7532, AP 7562, AP 82xx and AP 7502 and will throw an error if misconfiguration is detected.
3. Adaptivity recovery on/off command gives the user ability to configure adaptivity recovery. When adaptivity recovery is turned off, if radio enters adaptivity mode then it will not switch channels. By default – this feature is enabled.
4. LDAP chase referral has been disabled by default in all platforms to address memory and authentication related issues. It can be enabled if necessary under radius server policy.
5. If the CLI command - "upgrade <URL> on <device-name>" is being used, then please note it has been changed to "upgrade <URL> <device-name ...>".
6. Added additional filters to be used on rf-domain when remote-debug is done on rf-domain. Additional filters include area, floor, and containing a field which takes a substring of hostname and selects devices matching that hostname string to run remote-debug.

### **New in v5.8**

1. WiNG NSight
  - WiNG NSight is supported on the NX 9500, NX 9600 and VX 9000 platforms with the following scale limits:
    - VX 9000: Supports up to 10,000 APs (@ 500 RF domains) / 5,000 (@ 1000 RF domains)
    - NX 9500: Supports up to 6,000 APs (@ 200 RF domains)
    - NX 9600: Supports up to 3,000 APs (@ 200 RF domains)***[Note: NSight scale numbers are relatively lower in NX 9600 than NX 9500 due to IOPS limits in RAID5 disk configuration. Future WiNG releases will change RAID configuration in NX 9600 to RAID1+0 for improved IOPS]***
  - WiNG NSight license is preloaded in WiNG 5.8 (platforms: NX 9500, NX 9600, VX 9000) for immediate use, limited to 120 days from the date of install. The user is expected to purchase and install required number of WiNG NSight subscription license for continued operation.

- New dashboard created via one browser session will not be visible/available on a different, already open session. It will be available for any new session logins.
  - The filters, for instance – selecting a specific WLAN, on the Dashboard widgets will apply even when the user moves across sites/levels on the left-side navigation tree.
  - *Top/bottom 10 grid tables in the summary page (and in the widgets) will not show any data if the table entries values are zero.*
  - For WiNG NSight system running for a limited amount of time (few hours), ‘Top App by usage’ may not show details for larger aggregate statistic duration (1 month, 3 months).
  - ‘location’ command in the rf-domain configuration will be used to store geo-coordinates of the site-location for MAPVIEW functionality.
  - *While using ‘Heatmap’ on the MapView/Floormap, user must select one channel at a time for correct heatmap view*
  - *In Hierarchical Mode, an offline AP may show up as online status under local controller details. The correct AP status is shown on the Key Metric Strip or the device list/details.*
  - *In MapView/Floormap the user defined custom columns in show table option may not be retained after page refresh.*
  - *The top X charts in the summary page may show incorrect client count when the clients are roaming*
2. Captive-Portal
- Captive portal user database storage is supported on the NX 95XX/ NX 96XX/ VX 9000 and NX 75XX platforms with the following scale limits:
    - NX 95XX/ NX 96XX / VX 9000 - 2 Million user identities
    - NX 75XX - 1 Million user identities
  - If client device roams (to a nearby AP) between the initial connection redirect and the registration action, the registration may not work and user needs to close/open the browser to connect/register to the captive portal.
  - Upgrade to 5.8 (from 5.5.x and above) will do a one-time import on the existing (SQLite) user database into the newer MongoDB database.
  - Configure “bypass captive-portal-detection” in the captive-portal-policy to ensure the OAUTH functionality works properly on the iPhones and Windows mobile phones.
  - While uploading logo/images for captive portal using sftp in CLI, the user will not be prompted for a password and is expected to supply along with the username in the command line.
  - With over 1.5 million user entries in the Captive-Portal database, the controller may respond with a delay for the CLI command “show guest-registration user trends time all” when issued after restart/reboot.
  - User trend data graphs and charts are shown in UTC time zone.
3. Application Visibility & Control
- The Blackberry/email, Blackberry/encrypted and Blackberry/messenger will be categorized under the application ‘Blackberry’
  - *Clearing application stats resets the tx and rx counts to zero and does not affect the currently active flows.*
4. Client-Bridge
- Packet capture on the infra-AP with traffic using CCMP are unencrypted packets due to hardware based CCMP encrypt/decrypt operation.

- The INF WLAN VLAN must match the VLAN used in the Client Bridge GE1, WLAN, and SVI.
- 5. Wired 802.1x with Mac-Authentication enabled: Microsoft Windows clients must have "Fallback to unauthorized network access" enabled for mac-authentication to occur in the event of an 802.1x failure
- 6. EAP Termination
  - MS-CHAPv2 is mandatory for EAP termination functionality
- 7. VX 9000
  - Flash partition has been increased to 1Gb with the .iso install. Simple .img upgrade will continue to work with the old 64MB flash partition.
  - The user may observe "Low memory on the running VM" message when installing VX for the first time with large disk size allocations (1TB or more).
- 8. AP 7502
  - AP 7502 does not support WEP-128 and Keyguard on the 5GHz radio
- 9. To operate Cisco phones with AP 7532, the interface radio settings should include dynamic-chain-selection strict
- 10. Captive Portal: OAUTH may not work properly with Lumina phone running older Windows version (< 8.1). Please upgrade Lumina phones to latest OS.
- 11. The WiNG GUI may become unresponsive in Firefox browser when 10,000+ adopted APs are displayed on the navigation tree. This is due to Shockwave plugin.

#### **New in v5.7.0**

1. 'no ip dhcp trust' functionality does not work on the AP 7502 FE ports.  
FE port on AP 7502 will not drop the packet because switch on AP 7502 is not configured to drop. FE port will pass discover packets from dhcp server irrespective of "no ip dhcp trust" to ge1. User can configure GE1 to drop.
2. Wired captive portal – to support clients with MAC authentication, 802.1x configuration is also required for the controller
3. OpenDNS:
  - The dhcp server/pool policy configuration is required to include the OpenDNS IP (208.67.220.220, 208.67.222.222) as the dns-server
  - The ip access-list is required to include the following firewall rules to prevent clients from using any unauthorized DNS server  
*permit udp any host 208.67.222.222 eq dns rule-precedence 1 rule-description "allow dns queries only to OpenDNS"*  
*deny udp any any eq dns rule-precedence 10 rule-description "block all other dns queries"*
4. ETSI 1.7.1 Adaptivity Limitation on AP 622, AP 6522, AP 6562  
This note applies to the following APs that end with "-EU". These APs are sold to countries that comply with the EU directives - AP 622, AP 6522, and AP 6562. This does not apply to APs that end in "-US" or "-WR"
  - Radio 1 will support operation as a 2.4Ghz data radio compliant with ETSI 1.7.1 adaptivity directive
  - Radio 2 cannot be enabled for operation as a 2.4Ghz data radio. Radio 2 will support operation as a 5Ghz data radio only
  - If using Radio 2 in 2.4Ghz, please enable Radio 1 for data access in 2.4Ghz
  - When Radio 2 is configured as a dual-band security sensor with an ADSP appliance;
  - Radio 2 will not support Air Termination, AP Test, and Network Assurance at 2.4Ghz band

- Radio 2 will support receive packet and forensic security analysis at 2.4Ghz band
  - Radio 2 will support Air Termination, AP Test, Network Assurance and all packet receive functions on the 5Ghz band
5. The following defaults and CLI commands / help-strings have been changed as part of the de-branding:

	WiNG 5.7.x	Older versions
Default username / password	admin / admin123	admin / motorola
Default DNS name	"WiNG-wlc"	"Motorola-wlc"
Default WLAN name	"WLAN-1"	"Motorola"
CLI command	"wing-extensions"	"motorola-extensions"
	"wing-ie"	"symbol-ie"
CLI help string	WiNG	Motorola or Symbol
802.1x default username / password	admin / admin123	admin / motorola

6. AP 6522/6532/6562/7161 - VRRP and OSPF feature support have been removed

### **New in v5.6.x**

1. IPV6:
  - IPv6 ACLs do not support the object-oriented firewall feature in this release.
  - The IPv6 implementation does not support IPsec VPNs in this release.
  - IPv6 – MLD snooping is not supported on the ethernet switch ports on the NX 4524 and NX 6524 platforms. It is supported only on UP1, UP2 ports.
  - IPv6 – When there are multiple DHCP servers (one for IPv4 and another for IPv6) that respond to option 191, ensure that both provide valid IP addresses/ hostnames. Otherwise, with both servers responding the later response will override the previous response. If the later response does not contain valid information, AP will not be able to adopt to the controller.
2. VX 9000:
  - MAC address of the device should not be changed once installed/configured.
  - Only 1 GE1 interface is supported on the VX platform.
  - VX 9000 instances running in Amazon EC2 must use "Elastic IP" to retain the public IP when the instance is stopped and restarted.
  - VX 9000 - VMWare and other hypervisors need to be configured in promiscuous mode for features like VRRP to work correctly.
  - When creating a cluster between multiple VX 9000's, all instances should use identical resources (e.g. replication from one instance with higher memory to a smaller one can lead the smaller instance to run out of memory).
  - VX 9000 – Ipv6 is not supported when using Microsoft HyperV as the virtualization platform.
3. Captive Portal Time Based Voucher is only supported with Active: Standby configurations. Active: Active based clusters are not supported. The database gets replicated from the Active Controller to the Standby Controller periodically (default is 5 min).
4. Wired Captive Portal
  - If wired captive portal is being used along with wireless captive portal on the same controller, then same captive portal policy needs to be used for both wired and wireless captive portal enforcement.

- If Wired captive portal is being implemented for a bridged VLAN on the controller's physical interface that receives APs traffic, then applying wireless captive portal for the same bridge vlan is not valid, since the wireless client will then be subjected to captive portal enforcement twice.
5. The following default values have been changed/ corrected:
- *route-limit num-routes 12288 retry-count 5 retry-timeout 60 reset-time 1* | *route -limit num-routes 12288 retry-count 5 retry-timeout 60 reset-time 3*: reset time was changed from 1 to 3.
  - *vrrp-state-check* command previously present in "router ospf" context, has been moved to device/profile context
  - *min-misconfiguration-recovery-time 120*: increased from 60 to 120.

### **New in v5.5.x**

#### **1. Deprecating the usage of TKIP Encryption:**

From January 1<sup>st</sup>, 2014, the WPA-TKIP is no longer allowed for Wi-Fi Alliance product certification. For AP/STA products wishing to support a legacy device that can support only TKIP encryption, customer needs to implement mixed mode with WPA/WPA2.

Following changes are enforced from WiNG 5.5.3 release onwards to comply with the above Wi-Fi Alliance requirement:

- Configuring encryption type as TKIP for a wlan will no longer be supported; wlangs requiring to support TKIP clients should use *tkip-ccmp* as the encryption type.
  - Upgrading from a prior WiNG 5.x to release to WiNG 5.5.3 will automatically modify the configurations for wlangs using 'tkip' as encryption type to 'tkip-ccmp' and will add "service wpa-wpa2 exclude-ccmp" command to avoid any post upgrade incompatibility issues.
  - For new configurations, to handle certain legacy/non-Wi-Fi compliant client situations where the client driver is incompatible or does not operate properly in a mixed mode TKIP-CCMP configuration, add the following command "service wpa-wpa2 exclude-ccmp" to the wlan configuration. This configuration allows the wlan to operate in TKIP only modes until the non-compliant wireless clients are phased out of the network.
2. Ability to optionally include 'DHCP client-identifier' as part of DHCP Discover/Request packets: If your DHCP server uses DHCP client identifier for static bindings (DHCP lease reservations) and responds only to DHCP Discover/Requests with DHCP client identifier present, then the client identifier can be included by configuring the following command "DHCP client include client-identifier" under the SVI (interface VLAN X) which is configured as DHCP client.
3. Auto-provisioning policy: 'reevaluate-everytime' command is modified to 'evaluate-always' and moved to 'auto-provisioning-policy' from device/profile context. Upgrade from 5.5.1 to 5.5.3 or later versions should work in accordance with location and syntax changes. However, a downgrade from 5.5.3 to former versions would cause the command to disappear from all contexts.
4. Zebra devices with Jedi radios can have connectivity issues when 5.5 and 11 mpbs rates configured on infrastructure. Impacted devices are: MC1790, MC5590, MC7590, MC7594, MC9590, MC9596, MC3190, MC75, MC9190, MC55, VC6090, VC6096, MT2090, MK3900, MK4900, MK590.
- If SSID/band is used exclusively for 802.11g or 802.11gn devices (i.e. no 802.11b devices), configure the data-rates on the SSID/radio to be "g-only" or "gn" or custom with 5.5 and 11 Mbps excluded from the basic rate set.



If SSID/band is used by 802.11b-only devices as well, configure the data-rates on the SSID/radio to be custom with 1 Mbps and/or 2 Mbps as basic and exclude 5.5 Mbps and 11 Mbps from the supported rates.

5. CDP and LLDP protocols are enabled by default on WiNG devices. If the wired infrastructure has a combination of managed and unmanaged switches and some are not CDP protocol aware, then CDP protocol needs to be disabled on AP profiles to avoid the L2 switch flooding the packets to all ports.
6. WLAN controller does not retain saved auto upgrade configuration when downgrading from 5.5 to pre-5.5 release. This is because “ap-upgrade” commands were renamed to “device-upgrade” in 5.5. When upgrading to 5.5, the conversion happens automatically, however, when downgrading from 5.5 the previous firmware release does not understand “device-upgrade”. The workaround is to manually fix the configuration.
7. Mesh Connex Migration – With the introduction of Auto Channel Select, Mesh Connex Configuration will be migrated when the WLAN controller reboots. The following parameters get migrated:
  - Channel list from smart-rf is copied on to the rf-domain.
  - Priority meshpoint name and root recovery parameters are copied to the meshpoint-device configuration under device context or profile of the APs.
8. WiNG 5.5 introduced the addition of precedence to ip nat rules.

*ip nat inside source list mylist ?*

*precedence Set precedence of access list*

For example ip nat inside source list mylist precedence 1 interface vlan2 overload

9. In WiNG 5.5 legacy mesh related show commands have been replaced with ‘mint’ to remove confusion with meshpoint functionality. Use “show wireless mint links” to see the legacy mesh links.

#### **10. Captive Portal Deployments using External (or) Advanced pages:**

Captive portal query string delimiter has been changed to ‘&’ instead of ‘?’ from WiNG 5.5 onwards. When upgrading to a 5.5.x based firmware, the JavaScript embedded in the external or advanced webpage(s) needs to be updated to parse the new style of query strings.

Following line needs to be modified under function **getQueryVariable(variable)**,

**var vars = query.split("?");** **=== change it to ===** **var vars = query.split(/[?&]/);**

Please ensure that this function gets updated in all the captive portal pages that uses it.

#### **New in v5.4.x**

1. Interoperability with Samsung S2 devices:  
A Samsung Galaxy S2 device sometimes fails to connect using EAP-MAC authentication and WEP64 encryption. It's recommended to reduce the number of attempts (authentication eap wireless-client attempts) from default 3 to 2.
2. With 802.11r enabled WLAN – some clients might have problems associating. Please create a different WLAN for non 802.11r enabled clients.
3. MCX max range feature – the maximum range is 25 km except for 5Ghz 40Mhz channels where the range is 24km.
4. It's recommended disabling IP DoS attacks in firewall policy when configuring IGMP snooping.
5. 10 GbE support on the NX 9510 is limited to SFP+ SR interfaces that are included in the controller. LR or XR SFP+ are not supported.



## Deriving secondary IP

APs have a shadow or secondary IP for gaining access to the AP if the IP address of the AP is not known but the MAC address is known. To derive the shadow IP address of an AP, use the last two hex bytes of the AP's MAC address to determine the last two octets of the IP address.

- AP MAC address - 00:C0:23:00:F0:0A
- AP IP address equivalent – 169.254.240.10

To derive the AP's IP address using its factory assigned MAC address

- Open the Windows calculator by selecting Start>All Programs>Accessories>Calculator. This menu path may vary slightly depending on your version of Windows.
- With the Calculator displayed, select View>Scientific. Select the Hex radio button.
- Enter a hex byte of the AP's MAC address. For example, F0.
- Select the Dec radio button. The calculator converts the F0 to 240. Repeat this process for the last AP MAC address octet.

## 8. DFS TABLES, SENSOR AND RADIO SHARE

1. Following is the DFS support in WiNG 5.9.3 for the supported radio platforms:

Product	Master DFS FCC	Master DFS IC	Master DFS ETSI	Master DFS Japan	Client DFS FCC	Client DFS IC	Client DFS ETSI	Client DFS Japan
AP 7161	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
AP 6522 AP 6562	Disabled	Enabled	Enabled	Enabled	Disabled	Enabled	Enabled	Enabled
AP 8163	Disabled	Enabled	Enabled	Disabled	Disabled	Enabled	Enabled	Disabled
AP 7502	Enabled	Enabled	Enabled	Enabled	Disabled	Disabled	Disabled	Disabled
AP 7532 AP 7522	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
AP 7562	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
AP 8533	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
AP 8432	Enabled	Enabled	Enabled	Disabled	Enabled	Enabled	Enabled	Disabled
AP 7602	Disabled	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled
AP 7622	Disabled	Disabled	Enabled	Enabled	Disabled	Disabled	Enabled	Enabled
AP 7612	Enabled	Enabled	Enabled	Disabled	Enabled	Disabled	Enabled	Disabled
AP 7632	Enabled	Enabled	Enabled	Disabled	Enabled	Disabled	Enabled	Disabled
AP 7662	Enabled	Disabled	Enabled	Enabled	Enabled	Disabled	Enabled	Enabled

2. Air Defense sensor capabilities are supported on the 802.11n/802.11ac APs in this release and are available for enabling the WIPS functionality as well as the Network Assurance Capabilities. There are some caveats on managing the AP directly via ADSP, for certain AP platforms:

As a dedicated sensor	WIPS & Advanced Forensics	Spectrum Analysis	Advanced Spectrum Analysis	Live RF	Live View	AP Test	Connecti on Troubles hooting	WVA
AP 6522/6562	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
AP 7161	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
AP 7532/7522/7562 <sup>1</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
AP 8163	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
AP 7502	No	No	No	No	No	No	No	No
AP 8533 <sup>2</sup>	Yes	No	Yes	No	Yes	Yes	Yes	Yes
AP 8432 <sup>2</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
AP 7602/7622	Yes	No	No	No	Yes	No	No	No
AP 7632/ 7662/ 7612 <sup>1</sup>	Yes	No	Yes	No	Yes	No	No	No

Notes:

<sup>1</sup>AP 7522, AP 7532, AP 7562, AP 7632, AP 7662, AP 7612 radios are band-locked, entire AP needs to be dedicated as sensor

<sup>2</sup>Support is limited to the dedicated sensor (Radio 3) for AP 8533. Support is limited to the dedicated sensor (Radio 1) for AP 8432.

3. Radio Share functionality (allows for enabling the Network Assurance toolkit in ADSP, without dedicating a radio as a sensor) is available on the 802.11n/802.11ac APs with some caveats – please see details below:

In Radio Share mode	WIPS & Advanced Forensics	Spectrum Analysis <sup>2</sup>	Advanced Spectrum Analysis <sup>3</sup>	Live RF	Live View	AP Test <sup>5</sup>	Connecti on Troubles hooting	WVA
AP 6522/6562 <sup>1</sup>	No	No	Yes	Yes	Yes	Yes	Yes	No
AP 7161	No	No	No	Yes	Yes	Yes	Yes	No
AP 7532/7522/7562 <sup>4</sup>	Yes	No	No	Yes	Yes	No	Yes	No
AP 8163	No	No	Yes	Yes	Yes	Yes	Yes	No
AP 7502	No	No	No	No	No	No	No	No
AP 8533	No	No	No	No	No	No	No	No
AP 8432	Yes	No	No	No	Yes	No	Yes	No
AP 7602/7622	No	No	No	No	No	No	No	No
AP 7632/ 7662/ 7612 <sup>4</sup>	Yes	No	No	No	Yes	No	No	No

Notes:

<sup>1</sup>AP 6522, 6562 – The first radio is band-locked to 2.4Ghz. The second radio is capable of ABGN sensor operation.

- In Radio 1 = Sensor, Radio 2 = Wlan configuration, the sensor will only scan 2.4Ghz channels on Radio 1.
- In Radio 1 = Wan, Radio 2 = Sensor configuration, the sensor will scan both bands on Radio 2

- In Radio 1 = Sensor, Radio 2 = Sensor configuration, the sensor will scan 2.4GHz on Radio 1 and 5GHz on Radio 2

<sup>2</sup>Spectrum Analysis is not supported with Radio share enabled.

<sup>3</sup>Advanced Spectrum Analysis in RadioShare mode may impact WLAN performance.

<sup>4</sup>AP 7522, AP 7532, AP 7562, AP 7632, AP 7662, AP 7612 radios are band-locked, both radios are required for sensing

<sup>5</sup>AP Testing in radio share mode - only single-cell/internal BSS AP testing is supported. AP Testing on remote BSS is not supported.

## 9. VULNERABILITY UPDATES

In case a patch has been applied to address vulnerability even though vulnerability was addressed – some security scans only check the version number of the component as opposed to testing the actual vulnerability – and therefore might still report issue being present.

### WiNG 5.9.3

OpenSSL upgraded to 1.0.2o.

CVE-2018-5390 [VU#962459] [FICORA #1052508] Vulnerability Notification

CVE-2018-10124 Allows DoS attack by local users, via INT\_MIN argument

CVE-2018-10087 denial of service by triggering an attempted use of the -INT\_MIN value

CVE-2018-8897 The MOV to SS and POP SS instructions inhibit interrupts (including NMIs), data breakpoints, and single step trap exceptions, may result in unexpected behavior

CVE-2018-0739 Constructed ASN.1 types with a recursive definition could result in a DoS attack.

CVE-2017-18255 Linux kernel before 4.11 allows local users to cause a denial of service (integer overflow)

### WiNG 5.9.2

Following modules were upgraded in WiNG 5.9.2 to pick up latest vulnerability fixes:

Radiusd upgraded to v3.0.11.

OpenSSH updated to v7.6.

Lighttpd upgraded to v1.4.48.

openssl upgraded to 1.0.2m.

libCurl upgraded to 7.57.0

NTP upgraded to 4.2.8p11.

CVE-2017-18208 Linux kernel before 4.14.4 allows local users to cause a denial of service (infinite loop). CVE-2018-10940 CVE-2017-1000251 against linux 2.6.32.24 and 2.6.35.9

(cpe:/o:linux:linux\_kernel:2.6.32.24 and 2.6.35.9)

Multiple CVE's against openssl: 1.0.2h and 1.0.2j: CVE-2017-3737 and CVE-2017-3738

Multiple CVE's against Linux kernel 2.6.28.9, 2.6.32.24, 2.6.35.9 (CVE-2017-17052, CVE-2017-15116, CVE-2017-17807).

CVE-2017-15102, CVE-2017-15115, CVE-2017-16994, CVE-2017-16939, CVE-2017-12193 and

CVE-2017-15868 against Linux kernel 2.6.28.9, 2.6.32.24 and 2.6.35.9

CVE-2017-1000257: An IMAP FETCH response line indicates the size of the returned data, in number of bytes.

CVE-2017-15906: The process\_open function in sftp-server.c in OpenSSH before 7.6 does not properly prevent write operations in readonly mode, which allows attackers to create zero-length files.

libcurl 7.52.1 (cpe:/a:haxx:libcurl:7.52.1): CVE-2017-1000254, CVE-2017-1000100, CVE-2017-8816 and CVE-2017-8817

Multiple vulnerabilities against cpe:/a:gnu:glibc (CVE-2013-4237, CVE-2014-0475, CVE-2013-4458,

CVE-2014-6040, CVE-2013-4332, CVE-2013-7423, CVE-2013-7423, CVE-2014-8121, CVE-2014-7817, CVE-2017-16997)

#### **WiNG 5.9.1**

CVE-2017-10983, CVE-2017-10982, CVE-2017-10981, CVE-2017-10980, CVE-2017-10979, CVE-2017-10978 – FreeRadius 2.2.3 was patched to address those vulnerabilities  
CVE-2016-9806 - Race condition in the netlink\_dump function in net/netlink/af\_netlink.c in the Linux kernel before 4.6.3 allows local users to cause a denial of service.  
CVE-2017-7494 – Samba package was patched to address remote code execution vulnerability, allowing a malicious client to upload a shared library to a writable share, and then cause the server to load and execute it.

#### **WiNG 5.9.0**

CVE-2015-4680: FreeRADIUS 2.2.x before 2.2.8 and 3.0.x before 3.0.9 does not properly check revocation of intermediate CA certificates.  
NTPD package has been upgraded to ntp-4.2.8p10 to incorporate latest security vulnerability: CVE-2017-6464, CVE-2017-6462, CVE-2017-6463, NTP-01-011 NTP, NTP-01-010 NTP.  
CVE-2015-8983: Integer overflow in the \_IO\_wstr\_overflow function in libio/wstrops.c in the GNU can allow for DoS  
CVE-2015-8984: The fnmatch function in the GNU C Library (aka glibc or libc6) before 2.22 might allow context-dependent attackers to cause a denial of service  
CVE-2015-2877: Kernel Samepage Merging (KSM) in the Linux kernel 2.6.32 through 4.x does not prevent use of a write-timing side channel  
CVE-2017-6074: DCCP double-free vulnerability which allows local users to obtain root privileges or cause a denial of service (double free) via an application that makes an IPV6\_RECVPKTINFO setsockopt system call, has been fixed  
CVE-2016-3076: Heap-based buffer overflow in the j2k\_encode\_entry function in Pillow 2.5.0 through 3.1.1 allows remote attackers to cause a denial of service (memory corruption) via a crafted Jpeg2000 file is fixed by Updated pillow to 3.2.0 version.  
Libcurl package updated to 7.52.1 to address multiple vulnerabilities: CVE-2016-8615, CVE-2016-8616, CVE-2016-8617, CVE-2016-8618, CVE-2016-8619, CVE-2016-8620, CVE-2016-8621, CVE-2016-8622, CVE-2016-8623, CVE-2016-8624, CVE-2016-8625.

#### **WiNG 5.8.5**

OpenSSL package has been upgraded to 1.0.2j to incorporate latest security vulnerability fixes.

#### **WiNG 5.8.4**

CVE-2015-7560: Samba (smbd) package patched to address remote authenticated user access to arbitrary ACLs.  
libxml2 package has been upgraded to v2.9.2 and addresses CVE-2013-0339 and CVE-2014-3660 security vulnerabilities.  
CVE-2015-8552: Xen PCI driver patch fixes the denial of service vulnerability.

#### **WiNG 5.8.3**

OpenSSL package has been updated to 1.0.1p to incorporate latest security vulnerability fixes.  
CVE-2015-7547: Glibc getaddrinfo stack-based buffer overflow

TLS/SSL Server Support for DES and IDEA Cipher Suites (ssl-des-ciphers)

was removed

TLS 1.0 and TLS 1.1 disabled by default.

The SSH server support for the diffie-hellman-group1-sha1 key exchange algorithm, which is known to have a potential security weakness has been removed.

#### **WiNG 5.8.2**

Linux kernel patched to address security vulnerability CVE-2015-5707

#### **WiNG 5.8.1**

OpenSSL package has been updated to 0.9.8zg to incorporate latest security vulnerabilities fixes.

CVE-2015-5600 – OpenSSH package has been patched to address this vulnerability.

OpenLDAP package has been updated to incorporate latest security vulnerabilities fixes.

#### **WiNG 5.8**

cURL and libcurl packages have been patched to address security vulnerability CVE-2015-3143, CVE-2015-3145, and CVE-2015-3148.

RC4 algorithm has been disabled in SSL/TLS package used to address security vulnerability CVE-2015-2808.

NTP package has been upgraded to version 4.2.8p2 to address security vulnerabilities CVE-2015-1798 and CVE-2015-1799

Linux kernel patched to address security vulnerability CVE-2014-8160.

Xen package has been patched to address security vulnerabilities CVE-2014-8866, CVE-2015-2044, CVE-2015-2150, and CVE-2015-2151.

OpenSSL package has been upgraded to version 0.9.8zf to address security vulnerabilities CVE-2015-0289 and CVE-2015-0293.

#### **WiNG 5.7**

OpenSSL package has been upgraded from version 0.9.8za to 0.9.8zc to address Purecloud security scan vulnerabilities.

OpenSSH package has been ungraded to 6.6p1 and addresses security vulnerability CVE-2014-2532.

#### **WiNG 5.5.6:**

NTP v4.2.8p1 that addresses the following security vulnerabilities outlined in CVE-2014-9297, CVE-2014-9298, CVE-2014-9295, CVE-2014-9295, CVE-2014-9295, CVE-2014-9296 .

CVE-2015-0235 - GHOST Linux Vulnerability.

CVE-2014-4877 - wget updated to v1.16.

#### **WiNG 5.5.5**

Updated GNU bash program for NX series of controllers that fixes the Shellshock family of security vulnerabilities outlined in CVE-2014-6271, CVE-2014-7169, CVE-2014-7186, CVE-2014-7187, CVE-2014-6277, and CVE-2014-6278.

Includes ability to disable/enable sslv3 for https module under management policy context. This is to address CVE-2014-3566 aka Poodle attack. The new command is "https sslv3". The default setting is "no https sslv3".

#### **WiNG 5.5.2**

Security Scan reports NTP "monlist" Feature Denial of Service Vulnerability "Serious; see EUI"

### WiNG 5.5.1

Cross-Site Request Forgery (CSRF) based on CWE-352 family vulnerability

SecScan Qualys: Deprecated Public Key Length (QualysVersion Scanner 7.3.31-1, Vulnerability Signatures 2.2.580-2)

OpenSSH vulnerabilities - SSH Insecure HMAC algorithms enabled and SSH RC4 Cipher enabled

### WiNG 5.4.x

CVE-2010-4478 - OpenSSH J-PAKE Session Key Retrieval Vulnerability

CVE-2012-0814 - OpenSSH Commands Information Disclosure Vulnerability

CVE-2012-3547 - Radius Security Vulnerability: freeradius and EAP-TLS length checks buggy

CVE-2013-4559 - lighttpd: setuid/setgid/setgroups return values not checked

CVE-2011-4362 - lighttpd: out-of-bounds read due to signedness error

## 10. ISSUES FIXED

Following issues have been fixed in WiNG 5.9.3 release:

SPR/CR	Description
SPR-3342	AP 7602 CB connected to Cisco AP - no DHCP with CCMP encryption
SPR-3380	AP 7632 occasional panic at "PC is at kfree"
SPR-3444	DPD2 core seen when processing DPI metadata
SPR-3450	UI: DNS ALG firewall option missing for AP 7522
SPR-3451	Panic seen on VX controller - BUG: soft lockup in timeout_tick
SPR-3456	gcc library function getaddrinfo() crashes internally and that is a SEG Fault
SPR-3461	Client Bridge: AP 7612 stuck in scanning state for ever until reboot/reload
SPR-3462	NSIGHT - UI crashes while mapping/unmapping AP's from one floormap to another.
SPR-3471	AP 7632 Reset button not functional. In WING 5.9.3 the reset button is pressed and hold for 10 seconds, the factory reset configuration is applied.
SPR-3476	TKIP client unable to associate to AP 7632
SPR-3483	AP7632 client bridge:probe request sent with invalid supported rates
SPR-3484	Converted Express Virtual controller deployment ignores adoption request from non-express sku APs
SPR-3486	Probe request triggers false alarm on ADSP
SPR-3488	AP 75xx/8xxx has random kernel panic at PC is at neigh_periodic_work
SPR-3489	AP 7632 generated dpd2 core file
SPR-3491	AP 7632 generated RIM crash file
SPR-3493	Command to remove element 173 from beacon doesn't work on AP 7632
SPR-3494	APs detected in locationing feed flagged incorrectly as clients.
SPR-3495	AP 8432 No white LED indicator when configured as sensors
SPR-3496	AP 7632 losing ge1 config on reboot in mixed version operation
SPR-3498	Device List not getting updated in User Interface after looking into a specific device

SPR/CR	Description
SPR-3499	Unable to control wallplate LEDs while T5 gets adopted by WiNG controller
SPR-3502	Nsightd crash RangeError: Invalid string length in client.js
SPR-3503	Nsightd error alive_dev.py:153:run : Exception (<class 'pymongo.errors.DocumentTooLarge'>, DocumentTooLarge('BSON document too large (17079121 bytes) - the connected server supports BSON document sizes up to 16777216
SPR-3504	AP 7632 LEDs are not correct when AP configured for Client Bridge mode
SPR-3506	UI does not show floorplan in Tree Setup
SPR-3509	RFS 4000 - Radiusd process fails to start when db.duration file is corrupted
SPR-3514	UI: CP credentials issue when using password encryption
SPR-3515	VC AP 7632 - with ipv6 firewall enabled - sometimes panic is seen at igmp6_group_dropped
SPR-3519	NSight - No client details in RF Matrix Line Chart for Clients widget
SPR-3520	DPD2 CPU high utilization when configured for IPSEC tunnels
SPR-3523	UI should not allow SMART-RF overrides made at the device level - only rf-domain level
SPR-3525	Forgot Passcode feature does not work on self-registration Captive Portal
SPR-3526	IOS (Iphone/Mac) dhcp clients are unable to get an IP address when MCX is mapped to same radio as WLAN configured for enforce DHCP
SPR-3529	File-sync new trust point with digital certs intermittently not taking new trust point
SPR-3530	In HSRP network deployment – snoop table corruption is seen for HSRP router entry.
SPR-3532	Client Bridge: bridge on-link-loss shutdown-other-radio feature resets CB radio
SPR-3533	Client Bridge: Add / Remove / Modify on other radio resets the CB Radio
SPR-3538	AP7632-WR 802.11ac rates disabled for Ecuador for 40/80/160mhz channels
SPR-3542	Fabric Attach bindings can't be deleted once configured.
WING-35568	AP 7612/7632: Cisco phone connection is not stable on 5Ghz
WING-36140	NSight AVC: Need a report for application trend
WING-37006	VC Local image upload doesn't work on AP 7612/7632/7662 when using regular image
WING-37025	Egquest-replicat-set: Client Authentication fails when primary server is down.
WING-37027	UI: Unable to copy tech dump from controller NX 5500, NX 9500 and NX 9600
WING-37028	UI: Packet capture under troubleshooting is not working
WING-37098	AP 8532/8432: Bluetooth iBeacon estimate distance is closer than actual distance
WING-37116	Captive Portal pages are failed to display due to new changes in Chrome version 67+
WING-37212	NSight Monitor/Clients/Online Clients/Client Mac Address refreshes every 60 seconds and goes back to Online Clients screen
WING-37325	Legacy sensors periodically stop reporting LiverView information to ADSP running 9.5
WING-37331	Client Bridge: When CB configured with non-existing TP peap auth is allowed without server validation



SPR/CR	Description
WING-37394	AP 7532 IA sku - serial console needs to be still open when privileged access is password protected
WING-37410	Some Aeroscout functionality is not properly working on 11ac APs
WING-37454	NSIGHT - When you place an AP on floor map using the configure option, GUI crashes
WING-37520	hotspot_https.conf not updated with TP & hotspotsrvr not getting restarted immediately
WING-37535	Fabric Attach ISID max value should be 16777214 instead of 1000000 in GUI

## 11. KNOWN ISSUES

Following issues are known issues in WiNG 5.9.3:

CQ/ SPR	Headline	Comments
WING-23199	Even after disabling routing "show ip route" has all static route entry and traffic between two networks is not dropped	
WING-27180	EAP termination functionality may not work with certain versions of Cisco-ISE	
WING-29260	AP 8533 - Port is down permanently when changing from auto duplex to Half duplex/Full duplex (Speed 100Mbps)	Avoid setting Half duplex on AP 8533; use another interface to correct setting
WING-30726	Captive portal: MAC registration fallback with WeChat social authentication is not supported	
WING-31987	Error message while configuring Subnet/exclude-IP under Profiles-Network-Bridge VLAN in GUI	Workaround is to use CLI
WING-33284	NSight - In the Rf-Matrix, the legend masked on donut is not getting updated when you change between different parameters	
WING-34210	NSight: Devices get marked as offline randomly when the stats update interval is set to 5 minutes	Workaround - set update interval for Aps to no more than 2 min. For larger setup - only MU stats set to 5.
WING-34795	iPhone device gives error "disallowed user-agent" for google authentication	Enable "bypass captive-portal-detection" and use regular browser for google authentication.
WING-34972	NSight Dashboard: Themes and Widgets not visible during start up when Mongo DB is not fully loaded	Wait few minutes to open NSight UI after appliance start.
WING-34981	Dynamic VC: UI: newly elected VC is not marked as VC.	
WING-35482	AP 7612 OCS scans all channels every 30 seconds regardless of configuration and OCS channel list.	This is due to QCA limitation
WING-36579	Frictionless Onboarding: Accounting interim update is not supported.	
WING-36679	ExtremeGuest: Text widget: Wrong font was used after selecting a font.	click on text area and then select the font from toolbar, then enter the text.

CQ/ SPR	Headline	Comments
WING-36939	Facebook login with internal pages doesn't work	Enable "connection-mode https" under captive-portal.
WING-36706	ExtremeGuest: Sometimes the current widget could be override by dropping another widget. Sometimes not.	Remove the current widget, then drag and drop the new widget.
WING-36779	Sometimes "Show captive-portal sessions" command shows IP Address as "0.0.0.0" for the wired captive-portal client registered with ExtremeGuest and returning to the network.	There is no workaround other than looking at the "more system:/proc/dataplane/fw/l3_entity"
SPR-3467	AP7532i Setting minimum power level locks transmit rates to 11a only	This radio chipset limitation for AP 7522/7532/7562. Please don't configure power below 3 DBm.
WING-37526	AP 8432 - SoluM USB ESL device: user cannot configure VLAN on USB interface.	In this release, the USB interface will always operate with the default VLAN ID of 1.
WING-37586	Ble:Eddystone urls get suffixed with .com when forwarded to rest-server	
WING-37553	smart-rf: group-by area is not working when there are multiple smart-rf policy/rf-domain	
WING-37471	smart-rf: APs are not picking channels from the channel-list when its smart-rf policy is disabled in multiple smart-rf policy environment	
WING-37602	smart-rf: select-shutdown didn't re-enable previously shutdown radio after AP removed from rf-domain	

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**GLOBAL SUPPORT:**

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For information regarding the latest software available, recent release note revisions, or if you require additional assistance, please visit the Extreme Networks Support website.

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