Configure Pre-image Downloading a Secondary Image onto an AP with 32MB Flash System

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Introduction

This document describes the pre-image download process on an Acess Point (AP) and steps to consider in avoiding extended outage time.

Prerequisites

Requirements

Cisco recommends that you have knowledge of basic understanding of CAPWAP.

Components Used

The information in this document is based on these software and hardware versions:

- AIR-AP2602I-Z-K9
- WLC5508 primary image 8.2.154.7 and secondary image 8.2.151.0
- C3560 running 15.0(2)SE5

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

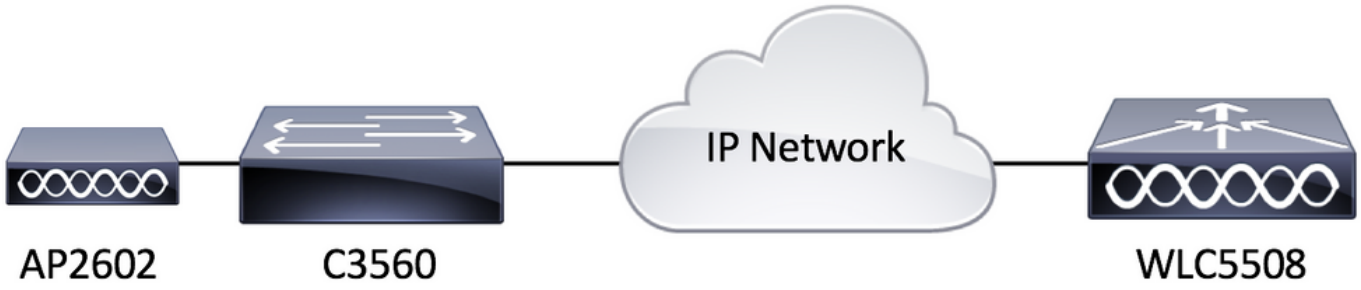
Background Information

This document describes a scenario where you want to validate whether a new release of Wireless LAN Controllor (WLC) code addresses a lingering WiFi issue but then it turns out it

doesn’t so you have to rollback to the previous release whilst minimizing the service outage time only to find that the Access Point (AP) is re-downloading the image from the WLC leading to a prolonged unplanned service outage time. This is a common scenario faced by technicians who maintain the wireless network for both internal and external customers.

Configure

Network Diagram



Configurations

There are no specific configuration requirements for this setup as long as the AP is able to register to the WLC.

Verify

Before pre-downloading a secondary image, let us check the content of the flash memory of a AIR-AP2602I-Z-K9.

```
L3-AP2602I-2#dir flash:
Directory of flash:/

    2  -rwx         337   Jan 1 1970 00:03:00 +00:00  info
    3  -rwx          64  May 31 2017 05:27:39 +00:00  sensord_CSPRNG0
   18  -rwx         100  May 31 2017 05:30:12 +00:00  capwap-saved-config
    7  drwx         576  Feb 15 2017 22:10:29 +00:00  ap3g2-rcvk9w8-mx
    8  drwx        2496  May 31 2017 05:27:30 +00:00  ap3g2-k9w8-mx.v153_3_jc.201704231800
   68  -rwx      128370  Nov 25 2015 15:20:46 +00:00  event.r0
   69  -rwx       58645  May 31 2017 05:27:46 +00:00  event.log
   70  drwx         704  Feb 27 2017 03:52:07 +00:00  configs
   21  -rwx       12312  May 31 2017 05:35:44 +00:00  private-multiple-fs
   72  -rwx          64  May 31 2017 05:27:39 +00:00  sensord_CSPRNG1
    6  -rwx         100  May 31 2017 05:35:44 +00:00  capwap-saved-config-bak
   22  -rwx       60456  May 31 2017 05:35:41 +00:00  lwapp_non_apspecific_reap.cfg
   87  -rwx       12945  Feb 14 2017 07:06:15 +00:00  policy.xml
   85  -rwx       68886  Feb 23 2017 07:55:24 +00:00  event.capwap
   93  -rwx         280  May 31 2017 05:30:13 +00:00  lwapp_officeextend.cfg
   41  -rwx         965  Feb 23 2017 07:55:48 +00:00  lwapp_mm_mwar_hash.cfg
   20  -rwx           0  Feb 23 2017 07:57:57 +00:00  config.txt
   76  -rwx         360  May 31 2017 05:30:11 +00:00  env_vars
   27  -rwx       95008  May 31 2017 05:30:38 +00:00  lwapp_reap.cfg
  103  -rwx       95008  May 31 2017 05:27:39 +00:00  lwapp_reap.cfg.bak

31739904 bytes total (9934848 bytes free)
```

As you can see, there are two images that exist on the AP. One is the recovery image that comes with the AP from factory and the other is the downloaded image from the WLC to which it is registered to. Another point to keep in mind is that the majority of the disk space is used by the recovery and the downloaded images. Finally, it's easy to tell that this is a 32MByte flash system. Let's check this again from the WLC view.

```
(WLC5508) >show boot
Primary Boot Image............................... 8.2.154.17 (default) (active)
Backup Boot Image................................ 8.2.151.0

(WLC5508) >show ap image all

Total number of APs.............................. 1
Number of APs
        Initiated........................................ 0
        Downloading...................................... 0
        Predownloading................................... 0
        Completed predownloading......................... 0
        Not Supported.................................... 0
        Failed to Predownload............................ 0

                                                  Predownload     Predownload                                    Flexconnect
AP Name            Primary Image  Backup Image   Status          Version         Next Retry Time  Retry Count   Predownload
------------------ -------------- -------------- --------------- --------------- ---------------- ------------- ---------
L3-AP2602I-2       8.2.154.17     3.0.51.0       None            None            NA               NA
```

Now let's pre-image download a secondary image and check the flash content one more time, as shown in the image.

```
(WLC5508) >config ap image predownload backup L3-AP2602I-2


(WLC5508) >show ap image all

Total number of APs.............................. 1
Number of APs
        Initiated........................................ 0
        Downloading...................................... 0
        Predownloading................................... 1
        Completed predownloading......................... 0
        Not Supported.................................... 0
        Failed to Predownload............................ 0

                                                  Predownload     Predownload                                    Flexconnect
AP Name            Primary Image  Backup Image   Status          Version         Next Retry Time  Retry Count   Predownload
------------------ -------------- -------------- --------------- --------------- ---------------- ------------- ---------
L3-AP2602I-2       8.2.154.17     3.0.51.0       Predownloading  8.2.151.0       NA               0
```

After it completes the pre-image download process, this image shows what you see next.

```
(WLC5508) >show ap image all

Total number of APs.............................. 1
Number of APs
        Initiated........................................ 0
        Downloading...................................... 0
        Predownloading................................... 0
        Completed predownloading......................... 1
        Not Supported.................................... 0
        Failed to Predownload............................ 0

                                                  Predownload     Predownload                                    Flexconnect
AP Name            Primary Image  Backup Image   Status          Version         Next Retry Time  Retry Count   Predownload
------------------ -------------- -------------- --------------- --------------- ---------------- ------------- ---------
L3-AP2602I-2       8.2.154.17     8.2.151.0      Complete        8.2.151.0       NA               NA
```

From WLC view, it all looks like the pre-image download went successful. However, before reloading the AP, let's check the flash memory content on the AP itself.

```
L3-AP2602I-2#dir flash:
Directory of flash:/

    2  -rwx          337   Jan 1 1970 00:03:00 +00:00  info
    3  -rwx           64  May 31 2017 05:27:39 +00:00  sensord_CSPRNG0
   18  -rwx          100  May 31 2017 05:30:12 +00:00  capwap-saved-config
    7  drwx          576  Feb 15 2017 22:10:29 +00:00  ap3g2-rcvk9w8-mx
   68  -rwx       128370  Nov 25 2015 15:20:46 +00:00  event.r0
   69  -rwx        58645  May 31 2017 05:27:46 +00:00  event.log
   70  drwx          704  Feb 27 2017 03:52:07 +00:00  configs
   21  -rwx          286  May 31 2017 05:50:07 +00:00  env_vars
   72  -rwx           64  May 31 2017 05:27:39 +00:00  sensord_CSPRNG1
    6  -rwx          100  May 31 2017 05:52:55 +00:00  capwap-saved-config-bak
   22  -rwx        60456  May 31 2017 05:52:12 +00:00  lwapp_non_apspecific_reap.cfg
    8  drwx         2496  May 31 2017 05:49:59 +00:00  ap3g2-k9w8-mx.153-3.JC6
   87  -rwx        12945  Feb 14 2017 07:06:15 +00:00  policy.xml
   85  -rwx        68886  Feb 23 2017 07:55:24 +00:00  event.capwap
   93  -rwx          280  May 31 2017 05:30:13 +00:00  lwapp_officeextend.cfg
   41  -rwx          965  Feb 23 2017 07:55:48 +00:00  lwapp_mm_mwar_hash.cfg
   20  -rwx            0  Feb 23 2017 07:57:57 +00:00  config.txt
   25  -rwx        12312  May 31 2017 05:52:54 +00:00  private-multiple-fs
   27  -rwx        95008  May 31 2017 05:30:38 +00:00  lwapp_reap.cfg
  103  -rwx        95008  May 31 2017 05:27:39 +00:00  lwapp_reap.cfg.bak

31739904 bytes total (9940480 bytes free)
```

So what just happened here? It looks like the original image got replaced with the secondary image in flash. The reason why this occurred is because the flash memory didn't have enough space to keep both the primary and the secondary image. Hence, the primary image got deleted and got replaced by the secondary image. The AP images are becoming bigger over time with added features such that the 32Mbyte flash system is no longer big enough to contain multiple AP images.

Now, if you are to reboot the WLC with the secondary image (to be safe, swap the AP image too), the predownloaded image comes up immediately as soon as the AP joins. However, if you were to rollback to the previous image, what you find is that the AP no longer has the old image and therefore redownloads from the WLC leading to prolonged service outage time to service the wireless clients which can be undesirable unless anticipated for during the maintenance window.

Troubleshoot

Some of the options to consider in order to minimize the prolonged outage time could be

Option 1. Clear AP flash memory with unwanted files such as crash files to free up as much space as possible using the AP CLI command **delete flash:/<filename>**.

Option 2. If applicable, utilize features such as FlexConnect AP Upgrade to minimize impact caused by slow WAN link by having a single Primary AP download an image over the WAN before distributing the image to the remaining APs as opposed to having all APs download image via slow WAN link. Full detail can be found at http://www.cisco.com/c/en/us/td/docs/wireless/controller/8-0/configuration-guide/b_cg80/b_cg80_chapter_0110001.pdf.

Option 3. Have in place a TFTP server geographically local to the AP to avoid downloading image via slow WAN link and manually load the AP image using the AP CLI command **debug capwap**

console cli followed by **archive download-sw /overwrite /reload tftp://<tftp server ip address>/<AP Image name>**. This table lists some of the common WLC versions recommended by TAC and its associated Lightweight AP image verison.

WLC Software	Lightweight AP Image
7.6.130.0	15.2(4)JB6
8.0.140.0	15.3(3)JA9
8.1.131.0	15.3(3)JBB6
8.2.151.0	15.3(3)JC5
8.3.112.0	15.3(3)JD4

If none of the options are a viable workaround, ensure you allow sufficient time for the rollback to finish during the maintenance window.