



Configuration Guide

Flash Provisioning in AOS

This configuration guide will assist in the use of the Flash Provisioning utility available with certain ADTRAN Operating System (AOS) products. To achieve this objective, this guide provides an overview of the utility, sample output, step-by-step process for configuring the flash provisioning utility, along with a section containing pertinent troubleshooting information. The information contained within this guide will allow the user to successfully configure all aspects of the AOS Flash Provisioning utility, allowing binary images, Tool Command Language (Tcl) scripts, and custom network configurations to be automatically applied to a unit.

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Flash Provisioning Overview

Flash provisioning is a utility that automatically updates CompactFlash® capable units with new copies of Tcl scripts, configuration files, and binary images. If desired, the flash provisioning utility can be used to reboot the unit so that the new files are applied.

Flash provisioning works in conjunction with AOS Tcl scripting capabilities, creating a powerful utility to easily upgrade code, create a standard default configuration, and require user input to answer site-specific questions. This minimizes the need for highly trained personnel to create sophisticated configurations when installing a unit in the field. For more information concerning Tcl scripts, refer to the *Tcl in AOS* configuration guide available on the *AOS Documentation* CD shipped with your unit or online at www.adtran.com.

Hardware and Software Requirements and Limitations

Support for flash provisioning was introduced in AOS version 17.1.1. It is currently available on the following NetVanta hardware platforms equipped with CompactFlash capability, and running AOS version 17.1.1 or newer: NetVanta 1335, 3430, and 3448.

As of AOS version 17.1.1, the Flash Provisioning utility is only available through the command line interface (CLI). There is no Web-based graphical user interface (GUI) support at this time.

The Flash Provisioning Process

Step 1: Construct the flashprov.txt File

The first step in the flash provisioning process is to create the **flashprov.txt** file. This file contains the names of the other files used during the flash provisioning process, as well as flags that determine optional behavior to be performed during the process. The **flashprov.txt** file has a very specific format that is required to prevent incorrect execution during any step of the process. An example of this format is shown below:

```
bizfile=NV3448A-7-01-00.biz
startupconfigfile=startup-config2
tclscriptfile=ShoInt.tcl
reloadflag=yes
archiveflag=yes
```

The **flashprov.txt** file can be generated using an ASCII text editor or the **copy console flash <filename>** command. It must reside in the root folder of the CompactFlash card, meaning that its location is **CFLASH:/flashprov.txt**. The flash provisioning process will not be invoked if the **flashprov.txt** file is located in a subfolder on the CompactFlash card, or is residing on the internal flash storage.

Syntax

When constructing the **flashprov.txt** file, certain syntactic rules must be observed.

- Tag names are not case sensitive, but their tag values (file names) are. Each tag value must have the exact capitalization as it exists in the file name it is references.

- A tag name and its value must be located on the same line within the file. It is, however, acceptable to have more than one tag name and tag value pair on a single line.
- All extraneous space and return characters are removed from the file when it is being parsed. As long as these characters are not located within a tag name or tag value, they will not result in errors.
- Tag values must not have a path specifying the location of the given file. All files must be located in the root directory of the CompactFlash card.

Format

A properly constructed **flashprov.txt** file must contain all five tag names, each followed by an equal sign. Any tag values placed after the equal signs are optional, and dictate the behavior of the flash provisioning process. The first three tag names indicate file names to be used by the process. The final two tag names are flags that determine whether or not optional processes will be performed.

Currently there are five tag names: **bizfile**, **startupconfigfile**, **tcscriptfile**, **reloadflag**, and **archiveflag**. Following is an explanation of each tag name and its behavior:

bizfile indicates the name of the binary image file used to update the firmware of the unit. This file must be located in the root directory of the CompactFlash card. If no tag value for this tag name follows the equal sign, then the unit's binary file will not be updated.

startupconfigfile indicates the name of the initial configuration file to be used when the unit boots up following the flash provisioning process. This file must be located in the root directory of the CompactFlash card. If no tag value for this tag name follows the equal sign, then the units previous configuration file is used.

tcscriptfile indicates the name of the Tcl script to be executed by the unit. This Tcl script file is commonly used to automate the task of custom network configuration. Tcl scripts can be used for a wide variety of tasks within the AOS environment. For more information on writing Tcl scripts refer to the *Tcl in AOS* configuration guide available on the *AOS Documentation CD* shipped with your unit, or online at www.adtran.com. This file must be located in the root directory of the CompactFlash card. If no tag value for this tag name follows the equal sign, then no Tcl script is executed during the flash provisioning process.

reloadflag indicates whether or not the unit should reboot at the completion of the flash provisioning process. If the value of **reloadflag** is equal to **yes** and a binary image file or startup configuration file was successfully copied by the flash provisioning process, then the unit will reboot. If the value of **reloadflag** is equal to **no**, then the unit will not reboot. If there is no tag value after the equal sign, the default behavior of **reloadflag** is to not perform a reboot. Tag values for the **reloadflag** tag name are not case sensitive. (For example, **Yes**, **yes**, and **YES** are all valid values.)

archiveflag indicates whether or not the previous versions of the binary image file and configuration file should be saved to the CompactFlash card for archive purposes. If the tag value of **archiveflag** is equal to **yes**, then the previous version of these files are saved to a time-stamped folder along with a **flashprov.log** file that contains the history of the events that occurred during the flash provisioning process. For more information on the flashprov.log file refer to the *Troubleshooting* section on page 7. If the tag value of **archiveflag** is equal to **no**, then the old files and process history will not be saved. If no tag value appears after the equal sign, the flash provisioning process will archive the old files by default. Values for the **archiveflag** tag name are not case sensitive. Note that performing the flash provisioning process, with archiving enabled, will increase the amount of time that the process takes to complete. Flash provisioning

archives binary images, configuration files, and the Tcl script to the CompactFlash card only if there is not sufficient storage on the internal flash memory to successfully copy the new files to the internal flash. Once the old file or files are copied into a time-stamped folder on the CompactFlash card, they are deleted from the internal flash. When sufficient internal storage exists, flash provisioning will copy the new files to the unit while leaving the old files on the internal flash memory.



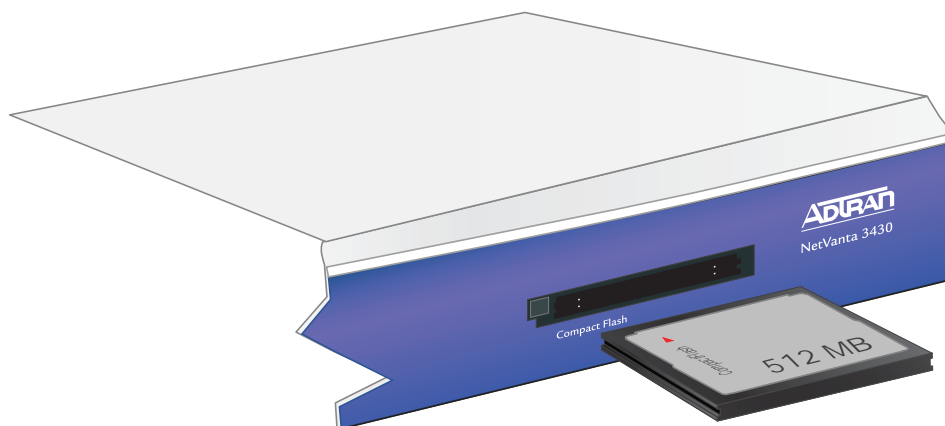
Performing the Flash Provisioning process, with archiving enabled, will increase the amount of time that the process takes to complete.

Step 2. Placing the flashprov.txt file and other data onto the CompactFlash card

The **flashprov.txt** file and all other associated files (binary image file, startup configuration file, and Tcl script file), if used, should be placed in the root directory of the CompactFlash card. The preferred method for loading files onto the CompactFlash card is to use a CompactFlash card reader connected to the computer where the files originate. For more information on copying files using a CompactFlash card reader, refer to the documentation included with the reader. If a card reader is not available the CompactFlash port on the ADTRAN unit may be used. The AOS commands **copy console flash** and **copy flash** may be used to create the **flashprov.txt** file, and to copy files from the unit's flash memory to the CompactFlash card. For more information on using these AOS commands, refer to the *AOS Command Reference Guide* available on the *AOS Documentation CD* shipped with your unit, or online at www.adtran.com.

Step 3. Insert the CompactFlash card into the unit

The CompactFlash card, loaded with all necessary files, should be placed into the CompactFlash slot on your AOS unit. The card should slide in until it seats firmly against the chassis of the unit. See the figure below for a visual representation of the CompactFlash slot and card insertion process.



Step 4. Connect to the unit using a VT100 terminal (optional)

The LED status indicator on the front of the AOS unit will flash rapidly during the flash provisioning process, providing a visual indicator that the process is ongoing. If you wish to visually monitor the progress, it is necessary to connect a VT100 terminal to the unit.

In order to connect to the unit, a VT100 terminal or personal computer with a VT100 terminal emulator is necessary. A DB-9 serial cable should be connected from the terminal or computer to the DB-9 port on the back of the AOS unit. The output of the flash provisioning process will then be displayed on the terminal or emulator. Example output can be seen in the section *Sample Output* below.

Step 5. Reboot the unit

Once the CompactFlash card is installed, reboot the unit and the flash provisioning process will begin. It is critical that the CompactFlash card is not removed until the process is complete. Removing the card could result in a non-functioning unit.



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The LED status indicator on the front of the unit will flash rapidly, alternating between amber and green, throughout the course of the Flash Provisioning process. Make sure to wait until the status LED is solid green for at least 5 seconds before removing the CompactFlash card from the unit. This will ensure that the process has been safely completed and that all files have been saved to the unit and the archiving process has been completed.



Make sure to wait until the status LED is solid green for at least 5 seconds before removing the CompactFlash card from the unit.

Sample Output

The following is a sample of the output produced by the flash provisioning process. The contents of the **flashprov.txt** file used in this example can be found in Step 1 on page 2.

```
ADTRAN, Inc., NetVanta 3448 (1200821E1)
AOS Version: 17.01.01.00, Checksum 7F6A185F, Mon Jul 09 19:13:22 2007
Cause of reset: Soft Reset
vfs: NONVOL: 248 tracks, 128 sectors/track, 1024 bytes/sector.
Compact Flash card inserted
Port manager: Probing slot 1... Nothing found.
SNMP Agent: Starting: Success!
FTP server: Starting service on first mounted drive.
cli: starting user interface
Persistence viewer: Restoring from NONVOL:/startup-config...
Persistence viewer: ... done.
```

Session now available

Press RETURN to get started.

```
2007.10.04 17:07:18 OPERATING_SYSTEM WARNING: Do not remove CompactFlash. Interrupting file
operation may cause system reboot or filesystem corruption.
Flash Provisioning: Copying CFLASH:/NV3448A-17-01-01-00.biz to NONVOL:/NV3448A-17-01-01-00.biz
Flash Provisioning: Percent Complete 100%
Flash Provisioning: File copied.
Flash Provisioning: Copying CFLASH:/startup-config2 to NONVOL:/startup-config2
Flash Provisioning: Percent Complete 100%
Flash Provisioning: File copied.
Flash Provisioning: Copying CFLASH:/ShoInt.tcl to NONVOL:/startup-script
Flash Provisioning: Percent Complete 100%
Flash Provisioning: File copied.
2007.10.04 17:09:19 OPERATING_SYSTEM.FILESYSTEM
Waiting for VFS write operations to complete.
The system will go down in 60 seconds or less.
2007.10.04 17:09:19 OPERATING_SYSTEM Flash Provisioning complete.
2007.10.04 17:09:19 OPERATING_SYSTEM Cold Start
```

The first section of output shows the text displayed during the unit's boot process. Everything prior to **Press RETURN to get started** is related to the boot process.

The second section of text details the copying of files from the CompactFlash card to the AOS unit. During this time the unit's status LED will rapidly flash amber and green. The flashing will pause between each file transfer. When using a terminal to monitor the status of the process, it is easy to see when the process is complete. However, when no terminal is used, it is imperative to wait until the status LED is solid green for at least 5 seconds before proceeding with another activity, to ensure that adequate time has been allowed for the flash provisioning process to complete.

Once all files are transferred, the unit will reboot if the value of **reloadflag** is equal to **yes**. The last four lines of text in the sample output indicate the messages associated with rebooting the unit. Once this point is reached, the flash provisioning process is complete and it is safe to proceed. If the unit has rebooted and a Tcl script file was transferred during the flash provisioning process, then the Tcl script will execute.

Troubleshooting

The most likely source of errors in using the flash provisioning process is an improperly constructed **flashprov.txt** file. The flash provisioning process will halt when it encounters an improperly constructed **flashprov.txt** file. For more information on constructing the **flashprov.txt** file refer to *Step 1: Construct the flashprov.txt File* on page 2.

A lack of sufficient storage on the internal flash memory may cause the flash provisioning process to not perform as expected. All unused files, particularly binary image files, should be removed from the internal flash memory before beginning the flash provisioning process. A lack of internal storage will not cause problems if archiving is enabled.

Restoring the previous configuration can be achieved using the flash provisioning log file created during the archiving portion of the process. If archiving is not enabled, then the log file will not be created.

**NOTE**

*No log file will be created by the flash provisioning process if **archiveflag** is set to **no**.*

The flash provisioning log file is named **flashprov.log** and is stored in the archive directory on the CompactFlash card. When flash provisioning archives a binary image, startup configuration, or Tcl script, the files are stored in a folder in the root of the CompactFlash card named **flashprov-archive**. For each invocation of flash provisioning, a specific subfolder is created within this general archive folder. The specific subfolder's name consists of the platform type followed by the current date and time. For instance, when upgrading a NetVanta 3448 at 1:38PM on October 11, 2007, flash provisioning would create an archive subfolder named **NetVanta3448-11Oct07-01-38-00PM**. Within this folder, flash provisioning stores a **flashprov.log** text file that records all the actions of flash provisioning along with any files removed from the internal flash.

In order to reverse the flash provisioning process, the files may be restored using the **boot system**, **boot config**, or **erase** commands from the AOS CLI. For more information on these commands, refer to the *AOS Command Reference Guide* available on the *AOS Documentation CD* shipped with your unit, or online at www.adtran.com. If the previous files no longer reside on the internal flash, but were archived by flash provisioning, users can copy the old files from the appropriate subfolder on the CompactFlash card to internal flash and set them as current image or startup configuration with the **boot system** or **boot config** commands.

**NOTE**

*For archive subfolder names to be meaningful, one should guarantee the current time is set correctly on the unit to be upgraded. Refer to the *AOS Command Reference Guide* for **sntp**, **set clock**, and **show clock** commands.*

To display the contents of the **flashprov.txt** file, use the command **show file cflash flashprov.txt** from the CLI.

To display archived flash provisioning updates, use the command **show cflash flashprov-archive/*** from the CLI.