FIPS Mode on Cisco NFVIS

FIPS mode on NFVIS

FIPS mode on NFVIS is a security compliance mechanism that

- implements Federal Information Processing Standards (FIPS) Publication 140-3 for United States federal government and contractor use
- attempts to prevent the use of non-FIPS compatible algorithms on the device, and
- requires manual configuration to ensure only FIPS approved algorithms are used.

FIPS mode behavior

In FIPS mode, certain functions may fail silently if they attempt to use non-compliant algorithms. You must ensure that the device is configured to use only FIPS-approved algorithms. FIPS mode is enabled by default on BExK platforms.

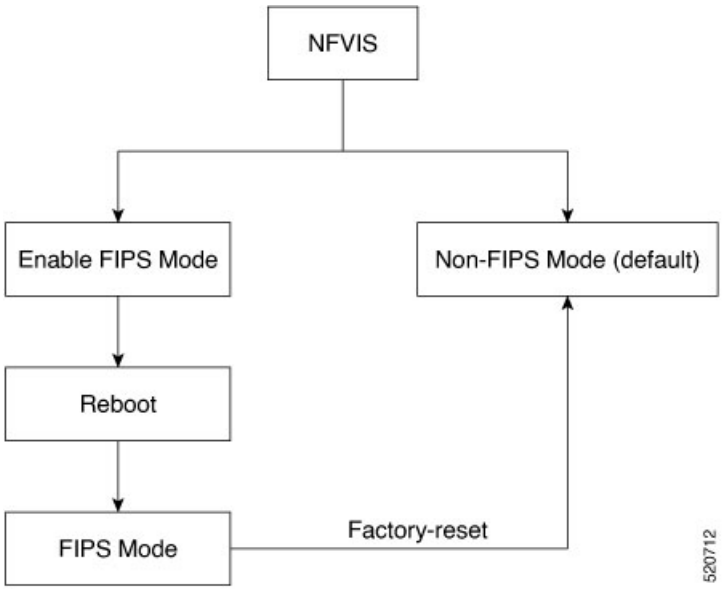
Disable FIPS mode

To disable FIPS mode, you must first perform a factory reset. After the reset, disable FIPS mode and reboot the device. The same steps apply when re-enabling FIPS mode.

Configure FIPS mode

FIPS mode enables FIPS 140-3 compliant operation for SSH, TLS and SNMP protocols on NFVIS.

NFVIS supports both FIPS and non-FIPS mode of operation.



Before you begin

Ensure that SNMP v1, v2, or v3 with MD5 auth protocol is not configured, as FIPS mode configuration will be terminated if these are present.

Procedure

Step 1 Enable FIPS mode.

Example:

```
config terminal
security fips
commit
```

Only after NFVIS reboot after the configuration FIPS mode is enabled.

FIPS mode can be disabled only with factory reset. If you try to disable FIPS mode with the no form of the command:

Example:

```
config terminal
no security fips
commit
Aborted: This command can only be removed while factory reset
```

Example:

The following is an example, where FIPS mode is successfully configured, but not enabled:

```
nfvis# show security
security fips-status CONFIGURED_REBOOT_TO_ENABLE
```

Step 2 Verify the status of the FIPS mode after reboot:

Example:

```
nfvis# show security
security fips-status ENABLED
```

FIPS mode configuration is terminated when:

- SNMP v1 or v2 is configured.

  The following is an example of FIPS mode configuration failure when SNMP v1 or v2 is configured:

  ```
  config terminal
  security fips
  commit
  Aborted: SNMP version 1 and/or SNMP version 2 is configure. Please unconfigure SNMPv1 and SNMPv2
   and then try again
  ```

- SNMP v3 is configured with auth protocol MD5.

  The following is an example of FIPS mode configuration failure when SNMP v3 is configured with auth protocol md5:

  ```
  config terminal
  security fips
  commit
  Aborted: SNMP version 3 MD5 auth-protocol configured other secure protocol and try again
  ```

Note
After FIPS mode is enabled, SNMP v1or v2 and SNMP v3 with auth protocol MD5 cannot be configured.

```
snmp group test_v1 snmp 1 noAuthNoPriv read test write test
commit
Aborted: Cannot configure SNMP group-version 1 because fips-status is ENABLED
```

```
config terminal
snmp user test_md5_v3
    user-version  3
    user-group test_v3
    auth-protocol md5
    auth-key 46:97:c3:b0:ba:45:fd:5e:be:99:44:c5:64:c9:bc:44
    commit
Aborted: 'snmp user test_md5_v3_passhd auth-protocol': Cannot configure SNMP user-version 3 with
auth-protocol MD5 because fips-status is CONFIGURED_REBOOT_TO_ENABLE
nfvis(config-user-test_md5_v3_passhd)#
```

FIPS mode is enabled and NFVIS operates in FIPS 140-3 compliant mode for SSH, TLS and SNMP protocols.

Backup and restore behavior for FIPS mode

This topic provides the details on how FIPS mode status is handled during NFVIS backup and restore operations.

If you back up NFVIS configurations when FIPS mode is enabled, then upon restore, FIPS mode is configured but needs a manual reboot to enable it.

```
Backup configuration
nfvis#
```

```
nfvis# show running-config security
security fips
nfvis# show security
security fips-status ENABLED
nfvis#
```

After restore

```
nfvis#
nfvis# show running-config security
security fips
nfvis# show security fips-status
security fips-status CONFIGURED_REBOOT_TO_ENABLE
nfvis#
```

After reboot

```
nfvis#
nfvis# show running-config security
security fips
nfvis# show security
security fips-status ENABLED
nfvis#
```

When you backup NFVIS configurations with FIPS mode disabled, but the system where you restore the configurations has FIPS mode enabled, upon restore, the NFVIS configurations disable FIPS mode but the system has to reboot for FIPS mode to be in DISABLED state.

Backup configurations

```
nfvis# show running-config security fips
% No entries found.
nfvis# show security fips-status
security fips-status DISABLED
nfvis#
```

Restore system configurations

```
nfvis#
nfvis# show running-config security
security fips
nfvis# show security
security fips-status ENABLED
nfvis#
```

After restore

```
nfvis# show running-config security
% No entries found.
nfvis# show security
security fips-status UNCONFIGURED_REBOOT_TO_DISABLE
nfvis#
```

After reboot

```
nfvis# show running-config security fips
% No entries found.
nfvis# show security fips-status
security fips-status DISABLED
nfvis#
```

FIPS operational status

This topic provides reference information about the operational states available when you try to ENABLE FIPS mode and the possible operational state transitions for FIPS mode.

These are the operational states when you try to ENABLE FIPS mode:

- DISABLED
- CONFIGURED-REBOOT-TO-ENABLE
- ENABLED
- UNCONFIGURED-REBOOT-TO-DISABLE
- FAILED

Table 1: FIPS mode operational state transitions

From	To	Description
DISABLED	CONFIGURED-REBOOT-TO-ENABLE	If the Oper data of FIPS-state leafs was previously set to DISABLED and if the **security FIPS** configuration is pushed
DISABLED	FAILED	If there is an error while pushing the **security FIPS** configuration
CONFIGURED-REBOOT-TO-ENABLE	ENABLED	If the FIPS-mode configuration is successful before and the Oper data was set to CONFIGURED-REBOOT-TO-ENABLE, then after REBOOT set the Oper data to ENABLED
CONFIGURED-REBOOT-TO-ENABLE	FAILED	If the Oper data of FIPS-state leafs was previously set to CONFIGURED-REBOOT-TO-ENABLE and there was an error while removing FIPS-mode configuration
CONFIGURED-REBOOT-TO-ENABLE	DISABLED	If the FIPS-mode is UNCONFIGURED while restoring from a backup package or factory-reset and the current FIPS-status is CONFIGURED-REBOOT-TO-ENABLE
ENABLED	DISABLED	After factory-reset (of any type)
ENABLED	FAILED	If there is an error while disabling the FIPS mode
ENABLED	UNCONFIGURED-REBOOT-TO-DISABLE	If the FIPS-mode is UNCONFIGURED while restoring from a backup package and the current FIPS-status is ENABLED
FAILED	CONFIGURED-REBOOT-TO-ENABLE	If the Oper date of FIPS-state leafs was previously set to FAILED and now configuring FIPS-mode
FAILED	DISABLED	If the Oper date of FIPS-state leafs was previously set to FAILED and now issued factory-reset

From	To	Description
UNCONFIGURED-REBOOT-TO-DISABLE	DISABLED	If the Oper data of FIPS-state leafs was previously set to UNCONFIGURED-REBOOT-TO-DISABLE and then NFVIS is rebooted
UNCONFIGURED-REBOOT-TO-DISABLE	CONFIGURED-REBOOT-TO-ENABLE	If the Oper data of FIPS-state leafs was previously set to UNCONFIGURED-REBOOT-TO-DISABLE and FIPS-mode config is successful
UNCONFIGURED-REBOOT-TO-DISABLE	FAILED	If the Oper data of FIPS-state leafs was previously set to UNCONFIGURED-REBOOT-TO-DISABLE and if the FIPS-mode config was unsuccessful