



# Cisco Crosswork NSO Telemetry Traffic Collector Function Pack 2.0.0

## Installation Guide

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. YOU MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

**Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)**

#### Copyright

© 2020 Cisco Systems, Inc. All rights reserved.

# Contents

- 1 Introduction .....4**
- 2 Before You Begin .....5**
  - 2.1 Prepare to Install Crosswork TM-TC FP .....5
- 3 Install Crosswork TM-TC FP .....6**
- 4 Verify the Installation .....10**
  - 4.1 Verify Crosswork TM-TC FP System Installation ..... 10
- 5 Perform Post Installation Tasks .....11**
  - 5.1 Uninstall Crosswork TM-TC FP ..... 12

# 1 Introduction

This document describes how to install and configure the Cisco Crosswork - NSO Telemetry Traffic Collector Function Pack (Crosswork TM-TC FP). This document is applicable to Cisco Crosswork version 4.0.

## Audience

This document is intended for Cisco Advanced Services developers, network engineers, and system engineers to install, configure, and deliver FP functionalities.

## Additional Documentation

This documentation requires the reader to have a good understanding of NSO and its usage as described in the NSO documentation.

Sl. No.	Documentation
1.	NSO Installation Guide
2.	NSO User Guide

## 2 Before You Begin

This section outlines the software requirements and platform dependencies to install the Crosswork TM-TC FP.

### 2.1 Prepare to Install Crosswork TM-TC FP

Install the following on your system before installing the Crosswork TM-TC FP:

1. Obtain NSO 5.4.2 installation bin file and follow the steps described in the **NSO Installation Guide – System Installation** to install NSO 5.4.2.

```
$ sudo sh nso-5.4.2.linux.x86_64.installer.bin --system-install --non-interactive
```

2. If you are running an earlier instance of NSO, make sure to stop the NSO instance.
3. If an older NSO version is installed, uninstall the older version of the NSO and install NSO 5.4.2.
4. Verify the NSO version.

```
$ ncs --version  
5.4.2
```

5. Make sure to have:
  - **sudo** user privileges to perform the installation. This user must also be part of the **ncsadmin** group.
  - OpenJDK 11 or higher is installed.
  - Python 3.8 or higher is installed. The default Python should point to Python 3.

### 3 Install Crosswork TM-TC FP

The Crosswork TM-TC FP can be installed on NSO system installation and local installation. System installation is for a real time production environment and the preferred method of installation

You must have **sudo** user privileges to perform the installation and run the installation commands.

#### To perform the TM-TC installation:

1. Log in to the host machine as the **ncs** user, who is also part of the **ncsadmin** user group and also has sudo access.
2. Obtain and download the **ncs-5.4.2-tm-tc-2.0.0.tar.gz** package from the Cisco website and copy it to the host server. This is the Crosswork TM-TC FP file.
3. Untar the Crosswork TM-TC FP package (**tar.gz**) file to the current directory. If the folder already exists, be sure to create a backup of the existing folder.

```
$ tar -xvzf ncs-5.4.2-tm-tc-2.0.0.tar.gz
```

The following table lists the packages and files that are extracted during the installation.

Group	Package Category	Packages
Function Pack Packages	Crosswork TM-TC FP Common Packages	TM-TC-2.0.0/ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz TM-TC-2.0.0/ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
Custom Template	Custom template utils	TM-TC-2.0.0/ncs-5.4.2-custom-template-utils-2.0.5-d0e53d5-2021-02-16.tar.gz
NEDs	CLI NED	TM-TC-2.0.0/ncs-5.4.2-cisco-iosxr-7.33.1.tar.gz

	NETCONF NED	TM-TC-2.0.0/ncs-5.4.2-cisco- iosxr-nc-7.3.1.tar.gz  TM-TC-2.0.0/ncs-5.4-cisco- iosxr-nc-6.6.3-3178944-2020- 07-07.tar.gz
--	-------------	---

4. Install the Crosswork TM-TC FP on the NSO and local systems. All the NED packages mentioned in above table are mandatory for TM TC functional pack.

#### System installation:

Copy the functional pack packages and NED packages to “packages” folder under “NSO running directory”. Make sure there are no duplicate packages. If the NED packages already exist with different name, user can skip copying those packages.

Download the Crosswork TM-TC FP 2.0.0 from cisco.com:

```
[root@localhost 2.0.0]# ls
ncs-5.4.2-tm-tc-2.0.0.tar.gz
```

Untar the package:

```
[root@localhost 2.0.0]# tar -xvzf ncs-5.4.2-tm-tc-2.0.0.tar.gz
TM-TC-2.0.0/
TM-TC-2.0.0/manifest.json
TM-TC-2.0.0/ncs-5.4.2-cisco-iosxr-7.33.1.tar.gz
TM-TC-2.0.0/ncs-5.4.2-cisco-iosxr-nc-7.3.1.tar.gz
TM-TC-2.0.0/ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz
TM-TC-2.0.0/ncs-5.4.2-custom-template-utils-2.0.5-d0e53d5-2021-02-16.tar.gz
TM-TC-2.0.0/ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
TM-TC-2.0.0/ncs-5.4-cisco-iosxr-nc-6.6.3-3178944-2020-07-07.tar.gz
```

```
[root@localhost 2.0.0]# ls
TM-TC-2.0.0 ncs-5.4.2-tm-tc-2.0.0.tar.gz
```

List the packages of TM TC 2.0.0

```
[root@localhost 2.0.0]# cd TM-TC-2.0.0/
[root@localhost TM-TC-2.0.0]# ls -l
manifest.json
ncs-5.4-cisco-iosxr-nc-6.6.3-3178944-2020-07-07.tar.gz
ncs-5.4.2-cisco-iosxr-7.33.1.tar.gz
ncs-5.4.2-cisco-iosxr-nc-7.3.1.tar.gz
ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz
ncs-5.4.2-custom-template-utils-2.0.5-d0e53d5-2021-02-16.tar.gz
ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
[root@localhost TM-TC-2.0.0]#
```

## Stop NSO

```
[root@localhost TM-TC-2.0.0]# /etc/init.d/ncs stop
stopping ncs (via systemctl): [ OK ]
```

## Copy the functional pack packages to NSO packages running directory

```
[root@localhost TM-TC-2.0.0]# cp *.tar.gz /var/opt/ncs/packages/
```

## Restart NSO

```
[root@localhost TM-TC-2.0.0]# /etc/init.d/ncs restart-with-
package-reload-force
Restarting ncs (via systemctl): [ OK ]
```

## Local installation:

Copy the functional pack packages and NED packages to “packages” folder under “NSO running directory”. Make sure there are no duplicate packages. If the NED packages already exist with different name, user can skip copying those packages.

## Download TM TC 2.0.0 from cisco.com

```
[root@localhost 2.0.0]# ls
ncs-5.4.2-tm-tc-2.0.0.tar.gz
```

## Untar TM TC 2.0.0

```
[root@localhost 2.0.0]# tar -xvzf ncs-5.4.2-tm-tc-2.0.0.tar.gz
TM-TC-2.0.0/
TM-TC-2.0.0/manifest.json
TM-TC-2.0.0/ncs-5.4.2-cisco-iosxr-7.33.1.tar.gz
TM-TC-2.0.0/ncs-5.4.2-cisco-iosxr-nc-7.3.1.tar.gz
TM-TC-2.0.0/ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz
TM-TC-2.0.0/ncs-5.4.2-custom-template-utils-2.0.5-d0e53d5-2021-02-16.tar.gz
TM-TC-2.0.0/ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
TM-TC-2.0.0/ncs-5.4-cisco-iosxr-nc-6.6.3-3178944-2020-07-07.tar.gz
```

```
[root@localhost 2.0.0]# ls
TM-TC-2.0.0 ncs-5.4.2-tm-tc-2.0.0.tar.gz
```

## List the packages of TM TC 2.0.0

```
[root@localhost 2.0.0]# cd TM-TC-2.0.0/
[root@localhost TM-TC-2.0.0]# ls -l
manifest.json
ncs-5.4-cisco-iosxr-nc-6.6.3-3178944-2020-07-07.tar.gz
ncs-5.4.2-cisco-iosxr-7.33.1.tar.gz
ncs-5.4.2-cisco-iosxr-nc-7.3.1.tar.gz
```



```
ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz
ncs-5.4.2-custom-template-utils-2.0.5-d0e53d5-2021-02-16.tar.gz
ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
[root@localhost TM-TC-2.0.0]#
```

### Stop NSO

```
[root@bg112-sp-esxi-017 ncs-run]# ncs -stop
```

### Copy the functional pack packages to NSO packages running directory

```
[root@bg112-sp-esxi-017 TM-TC-2.0.0]# cp *.tar.gz //home/nso/ncs-run/packages/
```

### Restart NSO

```
[root@bg112-sp-esxi-017 ncs-run]# ncs --with-package-reload-force
```

5. Verify the installation and make sure the packages are up and running. For more information, see **Verify the Installation**.
6. Perform post installation tasks for Crosswork TM-TC FP. For more information, see **Perform Post Installation Tasks**.

## 4 Verify the Installation

This section discusses how to verify the Crosswork TM-TC FP system installation. As part of the verification process, user must verify if the packages are up and package versions are set as expected.

### 4.1 Verify Crosswork TM-TC FP System Installation

Verify the build number, Crosswork TM-TC FP release information, and package versions to verify the Crosswork TM-TC FP installation.

1. Verify all the packages are up and running. An “X” indicates that the package is up.

```
[nso@localhost ~]$ ncs_cli -u admin -c

admin connected from 10.65.34.37 using ssh on localhost.localdomain
admin@ncs# show packages package oper-status
```

NAME	PROGRAM			PYTHON		BAD		PACKAGE			
	UP	ERROR	UNINITIALIZED	UNINITIALIZED	NCS	PACKAGE	PACKAGE	CIRCULAR	DATA	LOAD	ERROR
cisco-iosxr-cli-7.33	X	-	-	-	-	-	-	-	-	-	-
cisco-iosxr-nc-6.6	X	-	-	-	-	-	-	-	-	-	-
cisco-iosxr-nc-7.3	X	-	-	-	-	-	-	-	-	-	-
cisco-tm-tc-fp	X	-	-	-	-	-	-	-	-	-	-
custom-template-utils	X	-	-	-	-	-	-	-	-	-	-
tm-tc-multi-vendors	X	-	-	-	-	-	-	-	-	-	-

2. Verify the package versions and the build information.

```
admin@ncs# show packages package package-version
```

NAME	PACKAGE VERSION
cisco-iosxr-cli-7.33	7.33.1
cisco-iosxr-nc-6.6	6.6.3
cisco-iosxr-nc-7.3	7.3.1
cisco-tm-tc-fp	2.0.0
custom-template-utils	2.0.5
tm-tc-multi-vendors	2.0.0

```
admin@ncs#
```

## 5 Perform Post Installation Tasks

There are two types of post installation configuration that are required for the Crosswork TM-TC FP to work with CLI NED devices and Crosswork.

### 1. Configure **tm-tc cfp** configurations

```
[nso@localhost ~]$ ncs_cli -u admin -J
```

```
User admin last logged in 2021-04-01T02:59:08.023099-04:00,  
to localhost, from 10.65.34.37 using cli-ssh
```

```
admin connected from 10.65.34.37 using ssh on  
localhost.localdomain
```

```
admin@ncs> config
```

```
Entering configuration mode private
```

```
[ok] [2021-04-01 03:10:21]
```

```
[edit]
```

```
admin@ncs%
```

```
admin@ncs% set cisco-tm-tc-fp:cfp-configurations dynamic-  
device-mapping cisco-iosxr-cli-7.33:cisco-iosxr-cli-7.33  
python-impl-class-name tm_tc_multi_vendors.IosXR
```

```
[ok] [2021-04-01 03:11:05]
```

```
[edit]
```

```
admin@ncs% set cisco-tm-tc-fp:cfp-configurations stacked-  
service-enabled
```

```
[ok] [2021-04-01 03:11:12]
```

```
[edit]
```

```
admin@ncs% commit
```

```
Commit complete.
```

### 1. Configure NACM rules

```
[nso@localhost ~]$ ncs_cli -u admin -J
```

```
User admin last logged in 2021-04-01T02:59:08.023099-04:00,
to localhost, from 10.65.34.37 using cli-ssh
admin connected from 10.65.34.37 using ssh on
localhost.localdomain
admin@ncs> config
Entering configuration mode private
[ok][2021-04-01 03:10:21]

admin@ncs% set nacm read-default permit
[ok][2021-04-01 03:14:39]

[edit]
admin@ncs% set nacm write-default permit
[ok][2021-04-01 03:14:44]

[edit]
admin@ncs% set nacm cmd-exec-default permit
[ok][2021-04-01 03:14:55]

[edit]
admin@ncs% set nacm cmd-read-default permit
[ok][2021-04-01 03:15:02]

[edit]
admin@ncs% set nacm exec-default permit
[ok][2021-04-01 03:15:10]

[edit]
admin@ncs% commit
```

## 5.1 Uninstall Crosswork TM-TC FP

- To uninstall Crosswork TM-TC FP on NSO system installation instance, stop NSO and then remove the packages that were copied over to “NSO package running directory” during installation and restart NSO

### System installation:

#### Stop NSO

```
[root@localhost TM-TC-2.0.0]# /etc/init.d/ncs stop
Stopping ncs (via systemctl): [ OK ]
```

#### Remove the functional pack packages to NSO installation directory

```
[root@localhost nso]# cd /var/opt/ncs/packages/
```

```
[root@localhost packages]# ls -l
d1m-service-pack-5.4.2-latest.tar.gz
ncs-5.4-cisco-iosxr-nc-6.6.3-3178944-2020-07-07.tar.gz
ncs-5.4.2-cisco-iosxr-7.33.1.tar.gz
ncs-5.4.2-cisco-iosxr-nc-7.3.1.tar.gz
ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz
ncs-5.4.2-custom-template-utils-2.0.5-d0e53d5-2021-02-16.tar.gz
ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
[root@localhost packages]#

[root@localhost packages]# rm -rf ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz
[root@localhost packages]# rm -rf ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
[root@localhost packages]#
```

### Restart NSO

```
[root@localhost TM-TC-2.0.0]# /etc/init.d/ncs restart-with-
package-reload-force
Restarting ncs (via systemctl):      [ OK ]
```

### Local installation:

#### Stop NSO

```
[root@bg112-sp-esxi-017 ncs-run]# ncs --stop
```

Remove the functional pack packages to NSO packages running directory

```
[root@bg112-sp-esxi-017 packages]# pwd
/home/nso/ncs-run/packages

[root@bg112-sp-esxi-017 packages]# ls -l
ncs-5.4-cisco-iosxr-nc-6.6.3-3178944-2020-07-07.tar.gz
ncs-5.4.2-cisco-iosxr-7.33.1.tar.gz
ncs-5.4.2-cisco-iosxr-nc-7.3.1.tar.gz
ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz
ncs-5.4.2-custom-template-utils-2.0.5-d0e53d5-2021-02-16.tar.gz
ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
[root@bg112-sp-esxi-017 packages]#
[root@bg112-sp-esxi-017 packages]# rm -rf ncs-5.4.2-cisco-tm-tc-fp-2.0.0.tar.gz
[root@bg112-sp-esxi-017 packages]# rm -rf ncs-5.4.2-tm-tc-multi-vendors-2.0.0.tar.gz
```

### Restart NSO

```
[root@bg112-sp-esxi-017 ncs-run]# ncs --with-package-reload-force
```

- It is advised to remove only functional pack packages mentioned in the table under installation section. Removing the other packages might interrupt other operations on NSO.

This page is intentionally left blank.