

Configuring TFTP on NMS Platforms

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Introduction

Trivial File Transfer Protocol (TFTP) is used to transfer files to and from network devices.

Prerequisites

Requirements

Readers of this document should be experienced UNIX users who have access to the UNIX root account and System Management Interface Tool (SMIT) or System Administration Manager (SAM).

Components Used

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

- IBM AIX 4.2 or IBM AIX 4.3
- HP-UX 10.20 or HP-UX 11.0
- Sun Solaris 2.6 or Solaris 2.8

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.

Conventions

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

Procedure for AIX

/etc/inetd.conf – smit

To access TFTP services from the SMIT access menu, follow this path:

```
Communications Applications and Services > TCP/IP > Further Configuration > Server Network Services >
Other Available Services > Super Daemon (inetd) > inetd Subservers
    List All inetd Subservers
    Add an inetd Subserver
    Change / Show Characteristics of an inetd Subserver
    Remove an inetd Subserver
```

From this point, you can manipulate various **inetd** services. For further information on SMIT, refer to IBM Technical Documentation: AIX 4.3 .

When you issue the **loadrev** command or the **getfwrev** command, the WAN switch software expects the single alphabetic switch designation on the filename to be in uppercase and to reside in /usr/users/svplus/images/ipxbpx. To use the secure mode of TFTP, read the manual entry for TFTP daemon (tftpd) and note that /etc/tftpaccess.ctl needs to be maintained.

Verify Local TFTP

Use this method to verify the TFTP configuration by a TFTP to localhost:

```
cwm001% cd /tmp
cwm001% tftp localhost
tftp> bin
tftp> get /usr/users/svplus/images/ipxbpx/9231G.img
Received 784 bytes in 0.3 seconds
tftp> quit
cwm001%
cwm001% ls -al 9231G.img
-rw-r--r--  1 svplus  svplus      784 Feb 5 10:50 9231G.img
cwm001% diff /usr/users/svplus/images/ipxbpx/9231G.img 9231G.img
cwm001%
```

If the method above fails, a diagnostic message is provided to identify and solve the problem.

Verify File Permissions/Case

TFTP runs as the UNIX user nobody. Files must be readable by anyone, and all directories in the path must be searchable and readable.

```
cwm001% ls -al | more
total 4144
```

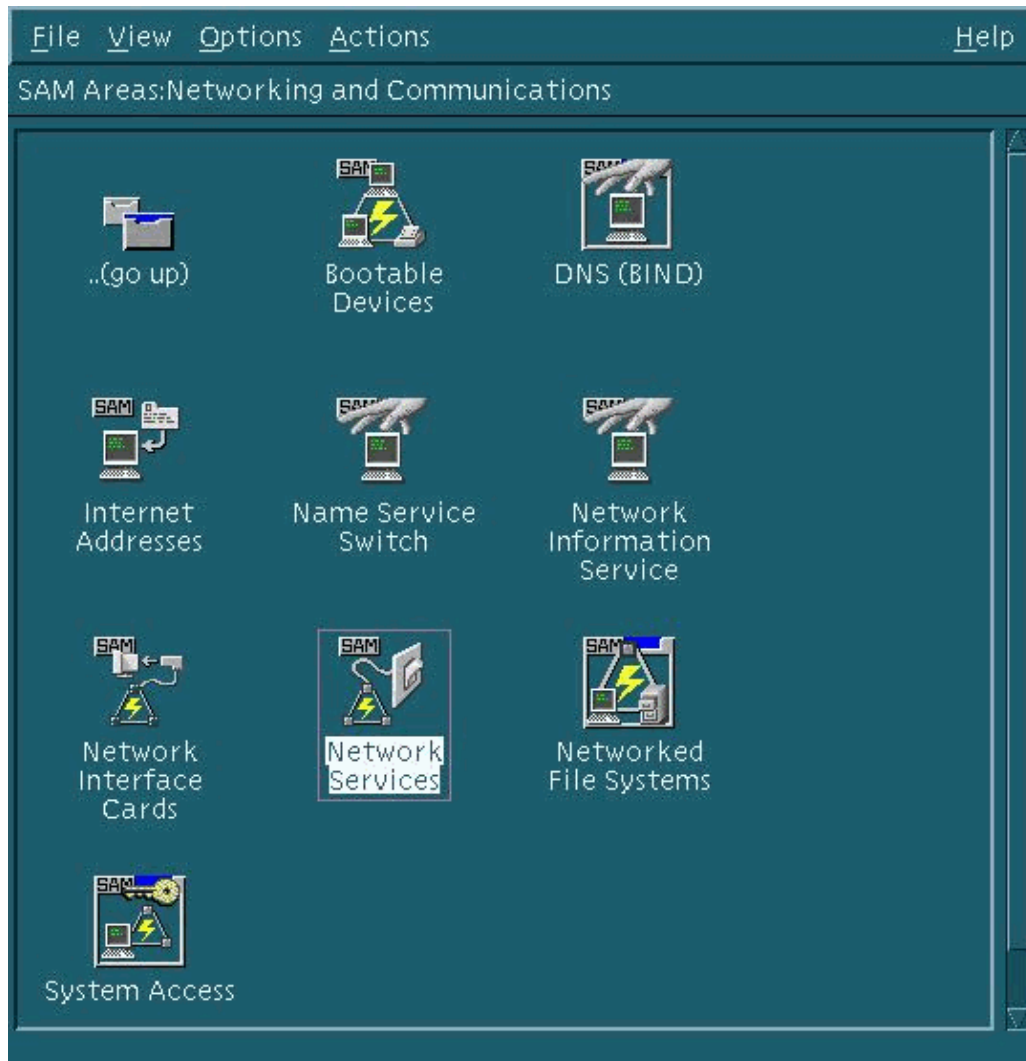
| | | | | | | | | |
|------------|----|--------|--------|--------|-----|----|-------|--------------|
| drwxr-xr-x | 2 | svplus | svplus | 1902 | Feb | 6 | 15:44 | . |
| drwxrwxrwt | 10 | svplus | svplus | 2718 | Feb | 6 | 15:44 | .. |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.000 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.001 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.002 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.003 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.004 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.005 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.006 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.007 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.008 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.009 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.010 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.011 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.012 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.013 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.014 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.015 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.016 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.017 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.018 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.019 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.020 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.021 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.022 |
| -rw-r--r-- | 1 | svplus | svplus | 65536 | Nov | 29 | 1999 | 9230B.023 |
| -rw-r--r-- | 1 | svplus | svplus | 15148 | Nov | 29 | 1999 | 9230B.024 |
| -rw-r--r-- | 1 | svplus | svplus | 784 | Nov | 29 | 1999 | 9230B.img |
| -rw-r--r-- | 1 | svplus | svplus | 502944 | Mar | 29 | 2000 | rel-9230.pdf |

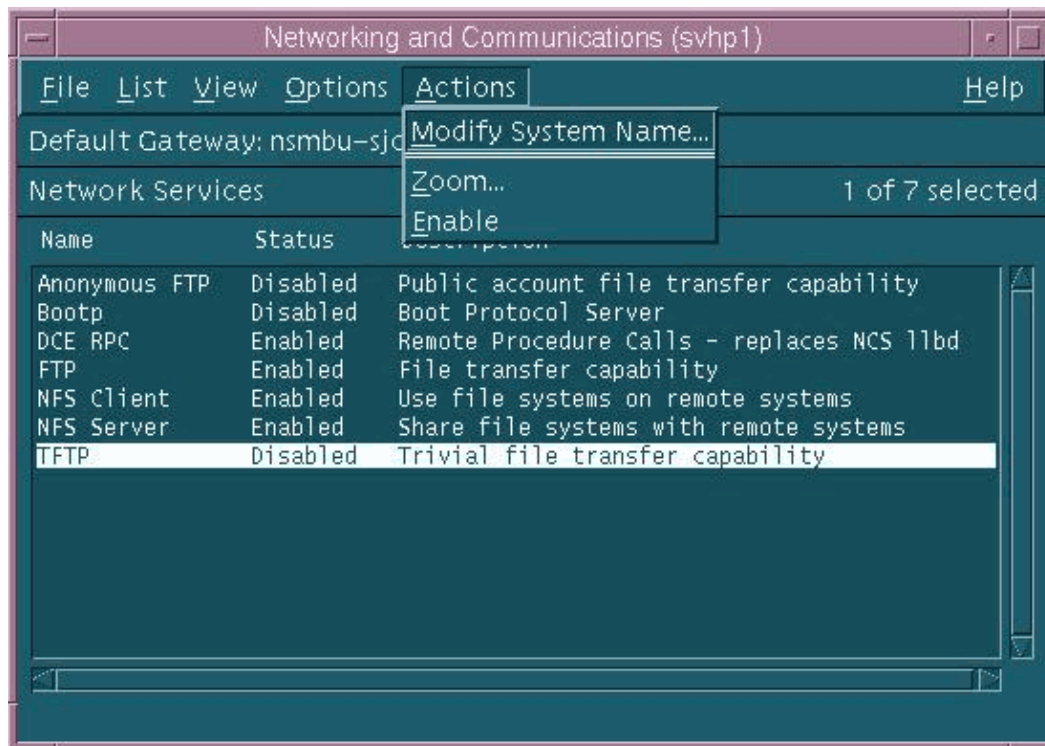
cwm001%

Procedure for HP-UX

/etc/inetd.conf – SAM

From SAM, access Network Services from the Networking and Communications area:





The default settings for TFTP daemon (tftpd) are shown above. When you enable TFTP services, password entries are created for the TFTP user. See the HP-UX online manual entries (using the **man xxxx** command) for **tftp(1)** and **tftpd(1M)** for details.

When you issue the **loadrev** command or the **getfwrev** command, the WAN switch software expects the single alphabetic switch designation on the filename to be in uppercase and to reside in `/usr/users/svplus/images/ipxbpx`. To use the secure mode of TFTP, you must have the path name `/tftpboot/usr/users/svplus/images/ipxbpx`, and it cannot be a symbolic link. To achieve this, create the file hierarchy and place all switch software and firmware under `/tftpboot`. A symbolic link can exist pointing from `/usr/users/svplus/images/ipxbpx/tftpboot/usr/users/svplus/images/ipxbpx`.

Switch software can erroneously claim that it cannot communicate with the Cisco WAN Manager (CWM) workstation if the file name has a lower case character for the switch designation or if the file does not exist on the CWM workstation.

After `/etc/inetd.conf` has been modified, secure mode **tftp** resembles this:

```
# Before uncommenting the "tftp" entry below, please make sure
# that you have a "tftp" user in /etc/passwd. If you don't
# have one, please consult the tftpd(1M) manual entry for
# information about setting up this service.

tftp      dgram udp wait    root /usr/sbin/tftpd  tftpd /tftpboot
```

The **inetd** process needs to be sent a HUP signal to force it to reread `/etc/inetd.conf`. For further details, refer to the HP-UX online manual entries for **tftp(1)** and **tftpd(1M)**.

Verify Local TFTP

Use this method to verify the TFTP configuration by a TFTP to localhost:

```
cwm001% cd /tmp
cwm001% tftp localhost
tftp> bin
tftp> get /usr/users/svplus/images/ipxbpx/9231G.img
Received 784 bytes in 0.3 seconds
tftp> quit
cwm001%
cwm001% ls -al 9231G.img
-rw-r--r--  1 svplus  svplus      784 Feb  5 10:50 9231G.img
cwm001% diff /usr/users/svplus/images/ipxbpx/9231G.img 9231G.img
cwm001%
```

If the method above fails, a diagnostic message is provided to identify and solve the problem.

Verify File Permissions/Case

TFTP runs as the UNIX user nobody. Files must be readable by anyone, and all directories in the path must be searchable and readable.

```
cwm001% ls -al | more
total 4144
drwxr-xr-x  2 svplus  svplus      1902 Feb  6 15:44 .
drwxrwxrwt 10 svplus  svplus      2718 Feb  6 15:44 ..
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.000
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.001
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.002
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.003
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.004
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.005
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.006
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.007
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.008
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.009
-rw-r--r--  1 svplus  svplus      65536 Nov 29 1999 9230B.010
```

```

-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.011
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.012
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.013
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.014
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.015
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.016
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.017
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.018
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.019
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.020
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.021
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.022
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.023
-rw-r--r-- 1 svplus svplus 15148 Nov 29 1999 9230B.024
-rw-r--r-- 1 svplus svplus 784 Nov 29 1999 9230B.img
-rw-r--r-- 1 svplus svplus 502944 Mar 29 2000 rel-9230.pdf

```

cwm001%

Procedure for Solaris

/etc/inetd.conf

The default settings for TFTP daemon (tftpd) from /etc/inetd.conf looks like this:

```

#
# Tftp service is provided primarily for booting. Most sites run this
# only on machines acting as "boot servers."
#
tftp dgram udp wait root /usr/sbin/in.tftpd in.tftpd
#

```

When you issue the **loadrev** command or the **getfwrev** command, the WAN switch software expects the single alphabetic switch designation on the filename to be in uppercase and to reside in /usr/users/svplus/images/ipxbpx. To use the secure mode of TFTP, you must have the path name /tftpboot/usr/users/svplus/images/ipxbpx, and it cannot be a symbolic link. To achieve this, create the file hierarchy and place all switch software and firmware under /tftpboot. A symbolic link can exist pointing from /usr/users/svplus/images/ipxbpx /tftpboot/usr/users/svplus/images/ipxbpx.

Switch software can erroneously claim that it cannot communicate with the CWM workstation if the file name has a lower case character for the switch designation or if the file does not exist on the CWM workstation.

After /etc/inetd.conf has been modified, secure mode tftp looks like below.

```
#
# Tftp service is provided primarily for booting. Most sites run this
# only on machines acting as "boot servers."
#
tftp    dgram    udp        wait       root       /usr/sbin/in.tftpd    in.tftpd -s /tftpboot
#
```

The inetd process needs to be sent a HUP signal to force it to reread /etc/inetd.conf.

Verify Local TFTP

Use this method to verify the TFTP configuration by a TFTP to localhost:

```
cwm001% cd /tmp
cwm001% tftp localhost
tftp> bin
tftp> get /usr/users/svplus/images/ipxbpx/9231G.img
Received 784 bytes in 0.3 seconds
tftp> quit
cwm001%
cwm001% ls -al 9231G.img
-rw-r--r--  1 svplus  svplus      784 Feb  5 10:50 9231G.img
cwm001% diff /usr/users/svplus/images/ipxbpx/9231G.img 9231G.img
cwm001%
```

If the method above fails, a diagnostic message is provided to identify and solve the problem.

Verify File Permissions/Case

TFTP runs as the UNIX user nobody. Files must be readable by anyone, and all directories in the path must be searchable and readable.

```
cwm001% ls -al | more
total 4144
drwxr-xr-x  2 svplus  svplus      1902 Feb  6 15:44 .
drwxrwxrwt 10 svplus  svplus      2718 Feb  6 15:44 ..
-rw-r--r--  1 svplus  svplus     65536 Nov 29  1999 9230B.000
-rw-r--r--  1 svplus  svplus     65536 Nov 29  1999 9230B.001
-rw-r--r--  1 svplus  svplus     65536 Nov 29  1999 9230B.002
```

```

-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.003
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.004
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.005
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.006
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.007
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.008
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.009
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.010
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.011
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.012
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.013
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.014
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.015
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.016
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.017
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.018
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.019
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.020
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.021
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.022
-rw-r--r-- 1 svplus svplus 65536 Nov 29 1999 9230B.023
-rw-r--r-- 1 svplus svplus 15148 Nov 29 1999 9230B.024
-rw-r--r-- 1 svplus svplus 784 Nov 29 1999 9230B.img
-rw-r--r-- 1 svplus svplus 502944 Mar 29 2000 rel-9230.pdf

```

cwm001%

truss

When a tftp daemon is invoked, it is done so from inetd. After identifying which file is being looked for, the root tftpd process invokes a child tftpd process, which runs as the UNIX user nobody. Running the **truss** command against these processes provides details about what is happening. In the following example, a root tftpd process is trussed, and shows that it is trying to open the nonexistent file, /usr/users/svplus/images/ipxbpx/9235B.img.

```
truss -fae -o /tmp/tftpd.truss -p 10748
```

Note: In this example, the process id of the root tftpd process is 10748.

```

# cat /tmp/tftpd.truss

10748: psargs: in.tftpd

10748: poll(0xEFFFDD88, 1, 60000)      (sleeping...)

10748: poll(0xEFFFDD88, 1, 60000)      = 1

10748: recvfrom(0, "\001 / u s r / u s e r s"..., 516, 0, 0x000245C4, 0x00023BF0) = 50

10748: alarm(0)                          = 0

10748: so_socket(2, 1, 0, "", 1)         = 3

10748: bind(3, 0x0002362C, 16)           = 0

10748: fork()                              = 10754

10754: fork()              (returning as child ...) = 10748

10754: setegid(60001)                    = 0

10754: seteuid(60001)                    = 0

10754: stat("/usr/users/svplus/images/ipxbpx/9235B.img", 0xEFFFFC88) Err#2 ENOENT

10754: setegid(0)                        = 0

10754: seteuid(0)                        = 0

10754: time()                            = 982191999

10754: write(4, " :8B0F7F\0\0\001\0020403"..., 24) = 24

10754: llseek(0, 0, SEEK_CUR)             Err#29 ESPIPE

10754: _exit(0)

10748: close(3)                            = 0

10748: poll(0xEFFFDD88, 1, 60000)      (sleeping...)

10748: poll(0xEFFFDD88, 1, 60000)      = 0

10748: kill(10749, SIGKILL)                = 0

10748: llseek(0, 0, SEEK_CUR)             Err#29 ESPIPE

10748: _exit(0)

#

```

Related Information

- [Using TFTP on a PC to Download WAN Switch Software and Firmware](#)
 - [IP Application Services Tech Notes](#)
 - [Technical Support – Cisco Systems](#)
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