



Configuring Software DSP

The Cisco VG410 Voice Gateway chassis utilizes its built-in CPU cores to handle the digital signal processing (DSP) tasks required for software implementation. This means that the functionality typically provided by a separate DSP component is instead distributed among the CPU cores within the device. As a result, there is no need for a physical DSP in this device. The Cisco VG410 Voice Gateway thus supports the Software DSP functionality which effectively replaces the PVDM4.



Note The Software DSP is a part of the vDSP container. The Software DSP and the virtual DSP (vDSP) are thus interchangeably used in this document.

Comparison Between Software and Hardware DSP

	VG with Physical DSP (motherboard or NIM)	VG410 with vDSP (use 1 physical core from CPU)
Installation	DSP is on board	The Software is installed by default, and upgrade or downgrade automatically happens when you perform an image upgrade or downgrade. Note The vDSP container is installed in the bootflash. Run the voice vdsp remove command if you need to format flash.
DSP Removal	Unplug the DSP physically to remove the DSP.	Run the voice vdsp remove command. The vDSP container is removed. To reinstall, run the voice vdsp install command.
Hardware module subslot	OIR DSP by CLI	Reload the DSP firmware running on the vDSP container.

	VG with Physical DSP (motherboard or NIM)	VG410 with vDSP (use 1 physical core from CPU)
Write, erase, reload	Perform the clean up startup-config	Clean up startup-config. The vDSP container continues to exist if the vDSP is already installed on flash. Run the voice vdsp remove command prior to running the write erase command.
VirtualPortGroup0 interface	Not applicable	An IOS interface connecting to the vDSP container. Move the existing service-engine configuration to the VirtualPortGoup0 interface.

Read the sections in this chapter to know how to install, verify, remove, and reinstall the vDSP container.

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Installing the Software DSP Container

The Software DSP functionality is available by default when you purchase a Cisco VG410 Voice Gateway.

This functionality is pre-installed in a vDSP container through the **voice vdsp install** command during the manufacturing process of the Cisco VG410 Voice Gateway. The default router configuration will thus include the following configuration during manufacturing.

```
interface VirtualPortGroup0
 ip address 192.168.253.250 255.255.255.252
 !
 !
 iox
 !
 app-hosting appid vdsp
 app-vnic gateway0 virtualportgroup 0 guest-interface 0
 guest-ipaddress 192.168.253.249 netmask 255.255.255.0
 app-default-gateway 192.168.253.250 guest-interface 0
 start
```

The following EEM scripts are also added during the manufacturing process through the **voice vdsp install** command.

```
event manager applet enableiox
 event none sync yes
 action 01 cli command "enable"
 action 10 cli command "conf t"
 action 20 cli command "iox"
 action 30 cli command "end"
event manager applet configvdsp
 event none sync yes
 action 01 cli command "enable"
```

```

action 02 cli command "show interface VirtualPortGroup0 | inc MTU"
action 03 string match "*bytes*" "$_cli_result"
action 04 if $_string_result ne "1"
action 10 cli command "conf t"
action 11 cli command "interface VirtualPortGroup0"
action 12 cli command "ip address 192.168.253.250 255.255.255.252"
action 13 cli command "app-hosting appid vdsp"
action 14 cli command "app-vnic gateway0 virtualportgroup 0 guest-interface 0"
action 15 cli command "guest-ipaddress 192.168.253.249 netmask 255.255.255.0"
action 16 cli command "app-default-gateway 192.168.253.250 guest-interface 0"
action 21 cli command "start"
action 23 cli command "end"
action 30 end

event manager applet installvdsp
event none sync yes
action 01 cli command "enable"
action 20 cli command "show app-hosting detail appid vdsp | inc Version"
action 10 string match "*Version*" "$_cli_result"
action 30 if $_string_result ne "1"
action 40 cli command "app-hosting install appid vdsp package flash:vDSP/vg4x0_vdsp.tar"
action 50 end

event manager applet noiox
event syslog pattern "('no iox')"
action 01 cli command "enable"
action 10 cli command "conf t"
action 20 cli command "no iox"
action 30 cli command "end"

event manager applet deactivdsp
event syslog pattern "vdsp stopped successfully"
action 01 cli command "enable"
action 03 file open fh bootflash:/vDSP/vg4x0_vdsp.state r
action 04 file read fh vdspstate
action 05 string match "$vdspstate" "upgrade"
action 06 if $_string_result eq "1"
action 10 cli command "app-hosting deactivate appid vdsp"
action 20 end

event manager applet upgradevdsp
event syslog pattern "vdsp deactivated successfully"
action 01 cli command "enable"
action 03 file open fh bootflash:/vDSP/vg4x0_vdsp.state r
action 04 file read fh vdspstate
action 05 string match "$vdspstate" "upgrade"
action 06 if $_string_result eq "1"
action 10 cli command "app-hosting upgrade appid vdsp package flash:vDSP/vg4x0_vdsp.tar"
action 15 file open fh bootflash:/vDSP/vg4x0_vdsp.state w
action 16 file write fh "done"
action 17 file close fh
action 20 end

```



Note You do not have to perform any manual installation steps to use the Software DSP functionality.

Verifying the Software DSP Container

To verify whether the Software DSP feature is pre-installed successfully and is functional, check for the following:

1. Run the **show platform** command. When the Cisco VG410 Voice Gateway starts, the virtual DSP slot 0/1 must be in the OK state.

```
vg410# show platform
Chassis type: VG410-48FXS
```

Slot	Type	State	Insert time (ago)
0	VG410-48FXS	ok	1d03h
0/0	2x1G	ok	1d03h
0/1	NIM-48FXS	ok	1d03h
R0	VG410-48FXS	ok, active	1d03h
F0	VG410-48FXS	ok, active	1d03h
P0	PWR-CC1-250WAC	ok	1d03h
P2	VG410-FAN-1R	ok	1d03h

2. Run the **show app-hosting list** command. You will see that the vDSP container is in the RUNNING state.

App id	State
vdsp	RUNNING

3. Run the **show voice dsp group all** command. The DSP state must be UP.

```
vg410# show voice dsp group all
DSP groups on slot 0/1 slot id 1
dsp 1:
  State: UP, firmware: 62.3.0
  Max signal/voice channel: 48/48
  Max credits: 720, Voice credits: 720, Video credits: 0
  num_of_sig_chnls_allocated: 48
  Transcoding channels allocated: 0
  Group: FLEX_GROUP_VOICE, complexity: FLEX
  Shared credits: 720, reserved credits: 0
  Signaling channels allocated: 48
  Voice channels allocated: 0
  Credits used (rounded-up): 0
  Slot: 0/1
  Device idx: 0
  Dsp Type: vDSP
```

4. Run the **show voice call summary** command. The voice ports should be in the FXSLS_ONHOOK state.

```
vg410# show voice call summary
PORT          CODEC      VAD VTSP STATE          VPM STATE
=====
0/1/0         -          - - -          FXSLS_ONHOOK
0/1/1         -          - - -          FXSLS_ONHOOK
0/1/2         -          - - -          FXSLS_ONHOOK
0/1/3         -          - - -          FXSLS_ONHOOK
0/1/4         -          - - -          FXSLS_ONHOOK
0/1/5         -          - - -          FXSLS_ONHOOK
0/1/6         -          - - -          FXSLS_ONHOOK
0/1/7         -          - - -          FXSLS_ONHOOK
0/1/8         -          - - -          FXSLS_ONHOOK
0/1/9         -          - - -          FXSLS_ONHOOK
0/1/10        -          - - -          FXSLS_ONHOOK
0/1/11        -          - - -          FXSLS_ONHOOK
0/1/12        -          - - -          FXSLS_ONHOOK
0/1/13        -          - - -          FXSLS_ONHOOK
.....
0/1/40        -          - - -          FXSLS_ONHOOK
0/1/41        -          - - -          FXSLS_ONHOOK
0/1/42        -          - - -          FXSLS_ONHOOK
0/1/43        -          - - -          FXSLS_ONHOOK
```

```

0/1/44      -      -      -      FXSLS_ONHOOK
0/1/45      -      -      -      FXSLS_ONHOOK
0/1/46      -      -      -      FXSLS_ONHOOK
0/1/47      -      -      -      FXSLS_ONHOOK

```

Further, all the voice ports should be in the **READY** state and displayed in the console or logging buffer.

```

*Jul 24 17:58:16.409: %LINK-3-UPDOWN: Interface Foreign Exchange Station 0/1/43, changed
state to ready
*Jul 24 17:58:16.409: %LINK-3-UPDOWN: Interface Foreign Exchange Station 0/1/44, changed
state to ready
*Jul 24 17:58:16.409: %LINK-3-UPDOWN: Interface Foreign Exchange Station 0/1/45, changed
state to ready
*Jul 24 17:58:16.409: %LINK-3-UPDOWN: Interface Foreign Exchange Station 0/1/46, changed
state to ready
*Jul 24 17:58:16.409: %LINK-3-UPDOWN: Interface Foreign Exchange Station 0/1/47, changed
state to ready

```



Note From Cisco IOS-XE 17.12.1a release, all Voice Gateway platforms must have the final voice port state to be **Ready** before you can begin making calls.

Reinstalling the vDSP Container

Although the Software DSP functionality is pre-installed with your Voice Gateway, in rare scenarios, you might have to manually reinstall the vDSP container. For example, when the default VirtualPortGroup0 IP address does not fit your deployment, you might have to configure the vDSP container manually. In these scenarios, perform the following steps to clean up, re-install, and configure the vDSP container.

The following two new commands have been introduced in Cisco VG410 Voice Gateway for the Software DSP installation and removal:

- **voice vdsp install**: Run this command in privilege exec mode to install the software DSP in the vDSP container. As a part of the installation process for a specific vDSPware version, it utilizes an EEM script to instantiate and deploy the vDSP container. Note that the same EEM script is used during vDSPware upgrade scenarios as well.
- **voice vdsp remove**



Note Whenever you perform a software upgrade for your device, the vDSP container is also automatically upgraded. You do not have manually reinstall the vDSP container after an upgrade.

SUMMARY STEPS

1. Run the **voice vdsp remove** command.
2. There are two ways to install the vDSP container. To install the vDSP container, perform one of the following steps:
 - Run the **voice vdsp install** command

- Use the app-hosting CLI. This method is suitable when you do not want to use the default IP address.

DETAILED STEPS

Step 1 Run the **voice vdsp remove** command.

Example:

```
vg410# voice vdsp remove
```

The EEM applets are removed and vDSP is uninstalled. Save the configuration after the vDSP is removed successfully.

Note To verify whether the vDSP container has been removed successfully, run the **show app-hosting list** command. You must see a No App Found configuration output.

```
vg410# show app-hosting list
      No App found
```

If you want to format the bootflash device, we strongly recommend that you run the **voice dsp remove** command beforehand.

Step 2 There are two ways to install the vDSP container. To install the vDSP container, perform one of the following steps:

- Run the **voice vdsp install** command

Example:

```
vg410# voice vdsp install
```

```
vg410# show app-hosting list
```

App id	State
vdsp	RUNNING

- Use the app-hosting CLI. This method is suitable when you do not want to use the default IP address.

Example:

```
!
interface VirtualPortGroup0
ip address [ipv4 address] [netmask]
!
!

app-hosting appid vdsp
app-vnic gateway0 virtualportgroup 0 guest-interface 0
guest-ipaddress [guest ipv4 address] netmask [mask]
app-default-gateway [gateway ipv4 address] guest-interface 0
start
end
```

Reinstalls the vDSP container.

For more information, refer [this link](#).

Verifying the vDSP Software Version

To verify the vDSP software version, run the **show voice dsp group all** command. Notice the firmware version that is displayed in the configuration output.

```
vg410# show voice dsp group all
DSP groups on slot 0/1 slot id 1
dsp 1:
  State: UP, firmware: 62.3.0
  Max signal/voice channel: 48/48
  Max credits: 720, Voice credits: 720, Video credits: 0
  num_of_sig_chnls_allocated: 48
  Transcoding channels allocated: 0
  Group: FLEX_GROUP_VOICE, complexity: FLEX
  Shared credits: 720, reserved credits: 0
  Signaling channels allocated: 48
  Voice channels allocated: 0
  Credits used (rounded-up): 0
  Slot: 0/1
  Device idx: 0
  Dsp Type: vDSP
```

Alternatively, you can also run the **show voice dsp** command to check the firmware version.

```
vg410# show voice dsp

DSP   DSP           DSPWARE CURR  BOOT           PAK   TX/RX
TYPE  NUM CH CODEC     VERSION STATE STATE   RST AI VOICEPORT TS ABORT  PACK COUNT
=====
----- FLEX VOICE CARD 0/1 -----
          *DSP VOICE CHANNELS*

CURR STATE : (busy)inuse (b-out)busy out (bpend)busyout pending
LEGEND      : (bad)bad   (shut)shutdown (dpend)download pending

DSP   DSP           DSPWARE CURR  BOOT           PAK   TX/RX
TYPE  NUM CH CODEC     VERSION STATE STATE   RST AI VOICEPORT TS ABRT  PACK COUNT
=====
          *DSP SIGNALING CHANNELS*

DSP   DSP           DSPWARE CURR  BOOT           PAK   TX/RX
TYPE  NUM CH CODEC     VERSION STATE STATE   RST AI VOICEPORT TS ABRT  PACK COUNT
=====
vDSP  001 01 {flex}     62.3.0 alloc idle   0 0 0/1/0   00 0      5/0
vDSP  001 02 {flex}     62.3.0 alloc idle   0 0 0/1/1   00 0      5/0
vDSP  001 03 {flex}     62.3.0 alloc idle   0 0 0/1/2   00 0      5/0
vDSP  001 04 {flex}     62.3.0 alloc idle   0 0 0/1/3   00 0
```

or,

```
vg410# show platform software subslot 0/1 module firmware
Bundled vDSPware Version 62.3.0, built on Jun 5 2023:12:11:41 from /nobackup/kctsai/62.3.0
```

To verify the vDSP version when you use the app hosting CLI, run the **show app-hosting detail appid vdsp** command. The following codeblock is a small snippet of the output of this command which displays the firmware version:

```
Vg410#show app-hosting detail appid vdsp
App id       : vdsp
Owner        : iox
State        : RUNNING
Application
```

```
Type           : docker
Name           : vDSPware
Version        : vdsp_version 62.3.0
Description     : virtual DSPware
Author         : Cisco Systems, Inc.
Path           : bootflash:vdsp/vg4x0_vdsp.tar
URL Path       :
Activated profile name : custom
```