Deploying the Digital Media Players

Series 2 DMPs: DMP-2K and SV-4K

Series 3 DMPs: CV-HD and CV-UHD

Series 4 DMPs: CV-HD2 and CV-UHD2

This module describes the workflow and tasks to deploy the digital media player. It is intended for Cisco Vision Dynamic Signage Director administrators and installers.

It includes the following topics:

- Prerequisites for DMP Deployment, page 53
- Workflow Summary to Deploy the Digital Media Player for the First Time, page 53
- Configuring the DMP Global Settings, page 54

Prerequisites for DMP Deployment

Before you deploy digital media players, be sure that the following requirements are met:

- The pre-deployment tasks are completed. For more information, see Planning Digital Media Player Deployment, page 45.
- The hardware is not yet powered up.

Workflow Summary to Deploy the Digital Media Player for the First Time

Table 1 on page 54 provides a summary of the tasks and related information to deploy the DMPs.

Caution: Follow the order of deployment tasks provided in Table 1 on page 54 so the DMP can be properly provisioned.

Table 1 DMP Deployment Task Workflow

Deployment Task	For more information see:
Configure the Connected Stadium switch for DMP operation (LLDP, IGMP).	■ Connected Stadium Switch Requirements, page 50. ■ For details about the configuration, see the Cisco Vision Network, Server, and Video Headend Requirements Guide available to qualified Cisco Vision partners.
Configure the DHCP server with Option 60 and Option 43.	■ For requirements, see External DHCP Server Requirements, page 49. ■ For Cisco CNR configuration, see the Cisco Vision Network,Server, and Video Headend Requirements Guide available to qualified Cisco Vision partners.
(**Mandatory**) Read and understand the firmware and auto-registration process for the digital media players.	■ Release Notes for Cisco Vision Dynamic Signage Director Release 6.3. ■ Cisco Vision Software Installation and Upgrade Guide: Dynamic Signage Director Release 6.3.
Obtain the firmware.	Refer to the following topics in Upgrading the DMP Firmware: ■ “Downloading the Firmware for all Media Players” ■ “Uploading the DMP Firmware to Cisco Vision Dynamic Signage Director”
Configure *base* and *production* firmware settings for auto-registration.	“Configuring the DMPs for Auto-Registration” topic in Upgrading the DMP Firmware.
Configure global DMP settings.	Configuring the DMP Global Settings, page 54
Power on the device.	–
Verify the startup sequence.	Verifying the DMP Startup Sequence, page 61

Configuring the DMP Global Settings

This section includes the following topics:

■ Time Protocols and Synchronization on the Digital Media Players, page 54
■ How to Configure NTP and PTP on the Digital Media Players, page 56

Time Protocols and Synchronization on the Digital Media Players

This section includes the following topics:

■ Network Time Sources for the Digital Media Players, page 55
■ PTP Leader and Members, page 55
■ DMP-to-DMP Content Synchronization, page 55
■ Zone-Based Video Wall Synchronization, page 55

- Use Cases for Video DMP-to-DMP Synchronization with PTP, page 55

Network Time Sources for the Digital Media Players

The DMP supports two different network time sources under the global DMP settings:

- Network Time Protocol (NTP)—This is the default.
- Precision Time Protocol (PTP)—Required for video wall synchronization feature and for DMP-to-DMP synchronization.

NTP and PTP settings are provisioned globally for all digital media players. The Cisco Vision Dynamic Signage Director server is provisioned as the default NTP source for all media players.

Note: When PTP is configured, only the DMP PTP leader derives its clock using NTP.

For the most accurate synchronization for video playback across DMP devices, the time on the target media players must be almost the same. NTP does not provide this level of time synchronization and accuracy, so PTP is also required.

PTP Leader and Members

The DMP is capable to serve as a PTP leader or as a PTP member, where members obtain their time from the leader. The PTP leader, in turn, will get its time from an NTP server.

By default, all DMP devices are designated as eligible leader candidates.

DMP-to-DMP Content Synchronization

The DMP-to-DMP Content Synchronization feature for the digital media player synchronizes content rendering of playlist items on the displays.

This synchronization includes transitioning from one item to the next (such as for still images), and more accurate playback and rendering of local video content. For local video, this serves as the foundation for implementing video ribbon boards and video walls. This requires cabling of a single media player per display.

Note: Widgets, external URLs, and multicast video tuning synchronization are outside the scope of this feature.

Zone-Based Video Wall Synchronization

Zone-based video wall synchronization is an alternative form of synchronization available for DMP devices participating in a video wall. It makes use of a mechanism native to the DMPs that helps a group of media players stay in content sync with a leader device over multicast.

The primary benefit of this form of synchronization is that if any DMP device that is not the leader in the video wall reboots, it will “catch up” to play whatever content item that the rest of the video wall is currently playing.

If a DMP device reboots in a video wall that is not using zone-based video wall synchronization (using normal DMP-to-DMP synchronization), the trade-off is that the rebooting device synchronizes with the rest of the video wall at the next content item in the playlist, or at replay of a single-item playlist.

The general guideline is to use zone-based video wall synchronization for dedicated video walls that are playing video content longer than 15 minutes. While you can use this form of synchronization for all video walls, the synchronization benefit is best seen with longer-playing video wall content.

Use Cases for Video DMP-to-DMP Synchronization with PTP

PTP is particularly beneficial for the following use cases in the Cisco Vision Dynamic Signage Director network:

- Using video background for Dynamic Menu Boards (DMBs) that show primary and secondary regions of the event.
- Sponsored moment of exclusivity.
- When a team scores a goal, a secondary video using the luma key feature can be shown on screen overlaying a full screen video showing the live event.
- Video-based ads.
- Ads in region 2 or 3 (or L-wraps) can now be video content. For L-wraps, use the luma key so that the live multicast video displays.

How to Configure NTP and PTP on the Digital Media Players

By default, both NTP and PTP services are automatically enabled for digital media players. The digital media players use PTP to achieve optimal synchronization. However, an NTP source also must be used to provide initial clocking to the devices that are elected PTP leaders in the network.

This section includes the following topics:

- Restrictions for PTP on the Digital Media Players, page 56
- Guidelines for NTP and PTP on the Digital Media Players, page 57
- Modifying the PTP and NTP Configuration on the Digital Media Players, page 58
- Verifying PTP Operation for the Digital Media Player, page 60

Restrictions for PTP on the Digital Media Players

Before you configure PTP on the digital media players, consider the following restrictions:

- By default, PTP messages will not cross VLANs and PTP leader candidates need to be identified for each VLAN and configured in the **Configuration > System Configuration** page.
- The system supports a configurable Precision Time Protocol (PTP) Time To Live (TTL) setting in the **Configuration > System Configuration** page. The PTP TTL specifies the number of VLANs that can be crossed for selection of a PTP leader. The default value of 1 (recommended) means that each VLAN will elect its own PTP leader.

  Note: For ease of configuration for venues with multiple VLANs, the system is configured by default to list all digital media players as eligible PTP leader candidates. However, be aware that although this simplifies configuration, the time that it takes for the devices to arbitrate a leader device in each network will vary, and depends on the number of eligible devices in each network.
- Content synchronization for video playback on the digital media players relies on precise time across DMPs using PTP. If the DMPs are playing video and one of the devices reboots, the rebooting unit will restart video playback from the beginning and will only synchronize with the other players when the next item in the playlist is rendered.
- If digital media players are participating in zone-based content synchronization for video walls, with some enhanced synchronization capability, the rebooting unit will synchronize with the current item being played by the device leader in the video wall. For more information, see “Working with Video Walls” in Release 6.3: Cisco Vision Dynamic Signage Director Operations Guide.

Guidelines for NTP and PTP on the Digital Media Players

Before you configure NTP and PTP on the digital media players, consider the following guidelines:

- For new installations of Cisco Vision Dynamic Signage Director, PTP is the default time source for the digital media players, with NTP as the default time source for the elected PTP leader.

NTP Guidelines

- Each digital media player designated as PTP leader (per VLAN) will use NTP as its time source. The other devices in the network operate using a PTP reference clock from the elected PTP leader.
- When PTP is disabled (not recommended), all devices use NTP to set their local clock.

  Note: For synchronized video playback, NTP alone cannot be relied upon for devices and PTP must be used.
- The default NTP synchronization interval with the host time server is one hour and is configurable.
- An NTP source must be configured in Cisco Vision Dynamic Signage Director. By default, the Cisco Vision Dynamic Signage Director server is configured as the device NTP host.

PTP Guidelines

- PTP version 2 is supported only for the digital media players and applies globally to all devices in the Cisco Vision Dynamic Signage Director network when configured.
- PTP configuration includes a PTP domain and a set of leader candidates:
  - PTP domain—Default is 0.

    Be sure that this domain does not conflict with any other PTP domain (and multicast addressing) in use in your network, and revise as needed. See table “Global DMP Settings—PTP Property Values” for more information.
  - PTP leader candidates—Default is *.

    This specifies that all devices in the network are eligible as leader candidates and will go through arbitration to designate a leader for their respective subnets.
- If you revise the default PTP leader candidates configuration, you must configure one or more devices as leader candidates in a semicolon-separated list of IP addresses for each VLAN.

  A minimum of two leader candidates per network is recommended.
- If there is an in-house PTP leader for your network, leave the “PTP leader candidates” property value blank. However, this configuration is only supported for venues without multiple subnets.

Modifying the PTP and NTP Configuration on the Digital Media Players

By default the NTP and PTP services are automatically enabled and configured for digital media players. Use this task if you need to modify the default settings described in Table 2 on page 58 and Table 3 on page 59.

Table 2 Global DMP Settings—PTP Property Values

Property (Registry key)	Description	Values
PTP domain (Globaldmpsetting.common.init.ptp.domain)	Domain number for the PTP network, which defines the multicast address for PTP communication.	For IEEE-1588 PTP, possible values are: **0**—(Default) 224.0.1.129 **1**—224.0.1.130 **2**—224.0.1.131 **3**—224.0.1.132
PTP leader candidates (Globaldmpsetting.common.init.ptp.master.host)	Eligible devices for leader candidate selection.	Possible values are: ■ ***—(Default). Wildcard pattern that specifies all devices in the network as eligible PTP leader candidates. ■ Semicolon-separated IPv4 addresses of the devices for each subnet. **Example:** 10.0.0.3;10.0.0.4;192.168.0.5;192.168.0.6 ■ blank—Specifies that a PTP leader source external to Cisco Vision Dynamic Signage Director is used. This configuration is only valid for a venue without devices in multiple subnets.
PTP time-to-live (Globaldmpsetting.common.init.ptp.ttl)	Number of VLANs that can be crossed for selection of a PTP leader.	1 (Default) **Note:** Best practice is to retain the default value of 1 for election of a PTP leader per video wall. With a TTL > 1, degradation in local video synchronization can occur.

Note: If the domain setting gets blanked, it will disable PTP on all DMPs. The DMPs will revert to using NTP as the time source.

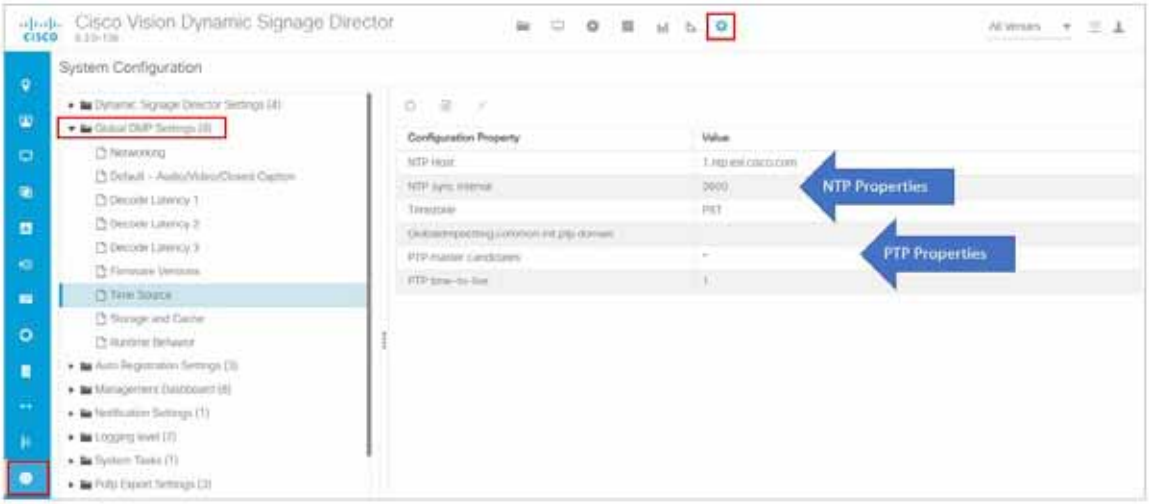
Table 3 Global DMP Settings–NTP Property Values

Property (Registry Key)	Description	Values
NTP Host (Globaldmpsetting.common.deploy.ntpc.hostname)	IPv4 address of the NTP server.	Default–IP address of the Cisco Vision Dynamic Signage Director server.
NTP sync interval (Globaldmpsetting.common.deploy.ntpc.interval)	Number of seconds that the device waits before trying to synchronize its time with the configured NTP host.	**3600** (Default)
Timezone (Globaldmpsetting.common.deploy.ntpc.timezone)	Code for the timezone to be used.	**GMT** (Default)

To modify the standard NTP and PTP configuration on all DMPs:

1. Log into the Cisco Vision Dynamic Signage Director server as an administrator.
2. Click **Configuration > System Configuration > Global DMP Settings > Time Source** (Figure 1 on page 59).

Figure 1 Global DMP Settings for NTP and PTP on the DMPs



3. (Optional) Change the global PTP properties as required for your network. Click the **Edit** icon (pencil). Refer to Table 2 on page 58.
4. (Optional) Change the global NTP properties as required for your environment. Click the **Edit** icon (pencil). Refer to Table 3 on page 59.
5. Click **Save**.
6. Reboot the devices.

Verifying PTP Operation for the Digital Media Player

This section describes how to verify the PTP configuration and also the operation of PTP for your devices.

To verify the PTP operation for the digital media player:

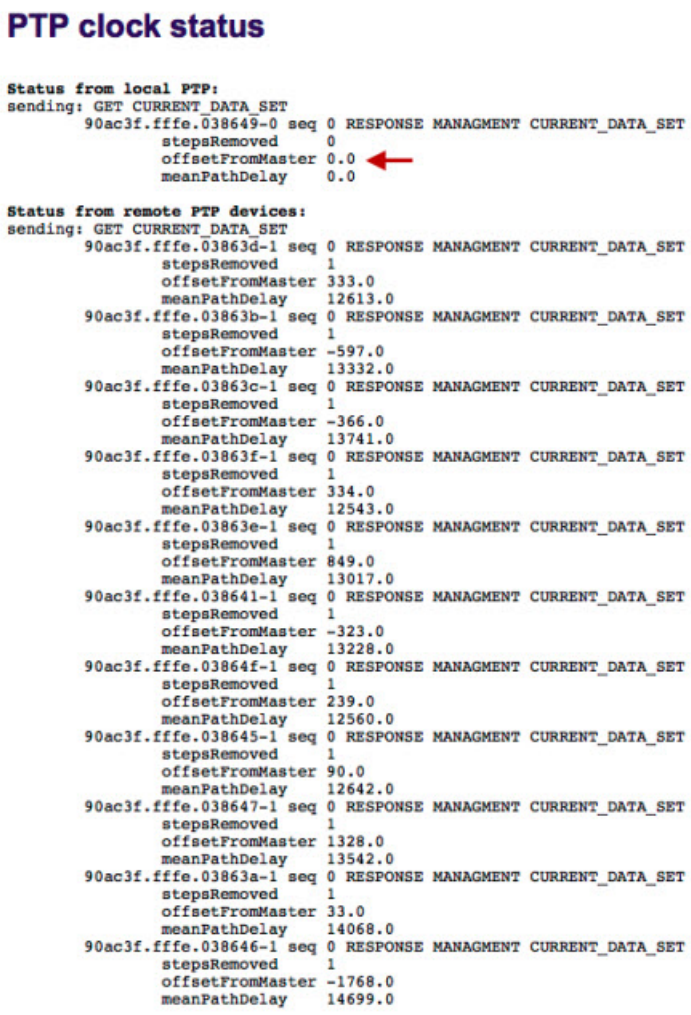
1. Open your browser and navigate to one of the DMPs:

   http://*sv4k-ip-address***/ptp.html**

2. Identify the PTP leader by finding the unit that has an “offsetFromMaster” value of 0.0.

Figure 2 on page 60 highlights the PTP leader and shows a network where PTP is operating successfully with 12 members.

Figure 2 Successful PTP Clock Operation



PTP clock status

```
Status from local PTP:
sending: GET CURRENT_DATA_SET
        90ac3f.fffe.038649-0 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     0
                offsetFromMaster 0.0
                meanPathDelay    0.0

Status from remote PTP devices:
sending: GET CURRENT_DATA_SET
        90ac3f.fffe.03863d-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster 333.0
                meanPathDelay    12613.0
        90ac3f.fffe.03863b-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster -597.0
                meanPathDelay    13332.0
        90ac3f.fffe.03863c-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster -366.0
                meanPathDelay    13741.0
        90ac3f.fffe.03863f-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster 334.0
                meanPathDelay    12543.0
        90ac3f.fffe.03863e-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster 849.0
                meanPathDelay    13017.0
        90ac3f.fffe.038641-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster -323.0
                meanPathDelay    13228.0
        90ac3f.fffe.03864f-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster 239.0
                meanPathDelay    12560.0
        90ac3f.fffe.038645-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster 90.0
                meanPathDelay    12642.0
        90ac3f.fffe.038647-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster 1328.0
                meanPathDelay    13542.0
        90ac3f.fffe.03863a-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster 33.0
                meanPathDelay    14068.0
        90ac3f.fffe.038646-1 seq 0 RESPONSE MANAGMENT CURRENT_DATA_SET
                stepsRemoved     1
                offsetFromMaster -1768.0
                meanPathDelay    14699.0
```