CISCO

DBDS System Time
Installation and Maintenance Guide

Please Read

Important

Please read this entire guide. If this guide provides installation or operation instructions, give particular attention to all safety statements included in this guide.

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Preface

About This Guide

Introduction

To maintain accurate system time and to eliminate time-related disruptions of cable services to your subscribers, the time settings of your Digital Broadband Delivery System (DBDS) components must be properly installed, maintained, and synchronized. Cisco recommends that you incorporate the procedures and instructions found in this guide into your routine DBDS maintenance schedule.

Note: For existing DBDS systems that require changes because of Daylight Saving Time (DST), refer to the *Daylight Saving Time Configuration Guide.*

Purpose

After reading this guide, you will be able to effectively manage your system time settings, verify your current settings, and properly synchronize your DBDS components.

Audience

This guide is written for system administrators responsible for maintaining a newly installed digital cable system.

To complete the procedures in this guide, you must have a basic understanding of the Cisco DBDS, the Digital Network Control System (DNCS), UNIX, and editing files in a UNIX environment. If you do not know how to perform a specific procedure, contact Cisco Services for assistance.

Scope

This guide provides procedures that will help reduce system time issues and issues associated with the fall and spring time changes by providing the following procedures and/or instructions:

- Installing the Digital System Time Kit to use the Global Positioning System (GPS) to manage and synchronize your time settings
- Configuring a Network Time Protocol (NTP) server to manage and synchronize your time settings
- Configuring, maintaining, and troubleshooting the DNCS and the Application Server when using *either* the GPS or an NTP server to synchronize your system time settings
- Managing your system time settings
- Synchronizing your DBDS components
- Selecting correct time zone settings for your hubs
- Resetting system processes
- Verifying pay-per-view (PPV) events

Requirements

The procedures in this guide are for new DNCS system installations operating at System Release (SR) 2.2/3.2 or later. You must also be running the most current version of DNCS Utilities on your system.

How to Use This Guide

Follow these suggestions for using this guide:

- Read Chapter 1, **DBDS System Time Overview**.

- For installing and configuring the *GPS hardware*, begin with Chapter 2, **Install and Configure the Digital System Time Kit to Use the Global Positioning System**, and follow the instructions and procedures in that chapter. Then go to Chapter 4, **DBDS System Time Maintenance**.

- For configuring an *NTP server*, begin with Chapter 3, **Configure an NTP Server**, and follow the instructions and procedures in that chapter. Then go to Chapter 4, **DBDS System Time Maintenance**.

- If you have installed and are currently using *either* the GPS or an NTP server on your system, go to Chapter 4, **DBDS System Time Maintenance**, and follow the instructions and procedures in that chapter.

- If you change or update your system time, go to Chapter 5, **Reset System Processes**, for detailed instructions on resetting your system processes. Then go to Chapter 6, **Pay-Per-View Events**, to verify your PPV events.

Related Publications

You may find the following publications useful as resources when you implement the procedures in this document. Check the copyright date on your resources to assure that you have the most current version. The publish dates for the following documents are valid as of this printing. However, some of these documents may have since been revised:

- *Daylight Saving Time Configuration Guide* (part number 749233, published February 2007)

- *DBDS Utilities Version 5.1 Installation Instructions and DNCS Utilities User's Guide* (part number 740020, published June 2006)

Document Version

This is the third release of this guide. References to Daylight Saving Time were removed from this document.

Chapter 1
DBDS System Time Overview

Overview

Introduction

This chapter provides an overview of how the DBDS manages system time.

In This Chapter

This chapter contains the following topic.

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DBDS System Time Synchronization Overview

Introduction

This section provides an overview of system time synchronization on the DBDS.

DBDS System Time Overview

In the DBDS network, the DNCS functions as the timekeeper. The DNCS automatically updates the time on each Quadrature Amplitude Modulation (QAM) device when the DNCS processes start and then every 12 hours after that. The time on a QAM device is also set when it reboots.

All time within the DNCS is measured as an offset from Greenwich mean time (GMT). GMT is the mean solar time of the meridian of Greenwich, England, and the time standard against which all other time zones in the world are referenced. GMT is not affected by DST. The actual amount of offset from GMT (time zone setting) and the configuration for support of DST are part of the Solaris configuration and are discussed later in this guide.

Note: The QAM devices use GMT and are not affected by DST.

DBDS Time Synchronization Overview

The DNCS can use one of the following three methods for synchronizing time in the DBDS environment:

- Manually setting the DNCS internal (Solaris) clock
- Global Position System (GPS) clock
- Network Time Protocol (NTP) server.

This section provides a description of each of these time synchronization methods.

Important:

- Manually setting the system clock is highly unreliable and is only suggested for lab environments where the clock setting is not really significant. Systems that provide services to subscribers should use one of the other methods listed (GPS or NTP server) to keep the DNCS and DBDS network time properly set.

- If you are using either an external (GPS) clock or an NTP server, the DNCS maintains the time as directed by the GPS or the NTP server. However, you should periodically verify that DNCS synchronization to the time source is maintained.

Note: With either the GPS- or NTP-based solutions for maintaining accurate DBDS system time, an outage or fault represents a minor issue. The clock in the SUN Solaris workstation *does* drift over time, but not at such a rate that a failure to obtain time from an external source represents an immediate issue.

DNCS (Solaris) Internal Clock

The DNCS maintains an offset from GMT based on the /etc/TIMEZONE file settings.

The DNCS broadcasts GMT system time messages (STMs) every 10 seconds to all Digital Home Communications Terminals (DHCTs). These STMs, in conjunction with the provisioned timezone settings, govern the time that is displayed on the front panel of the DHCTs.

The QAM devices insert time into the Entitlement Control Messages (ECMs) it generates. The DHCT then validates this time against the time delivered in time-of-day (TOD) Global Broadcast Authenticated Messages (GBAMs). This ECM/GBAM time is only used for conditional access purposes and does not affect the time displayed on the DHCT front panel.

External Global Positioning System (GPS) Clocks

With the GPS clock, the DNCS acquires its time synchronization using a signal from the GPS satellite network. This is a highly accurate method of keeping time and has the significant advantage of not depending on any other network devices to maintain correct time on the DNCS. There is a simple, direct connection between the GPS receiver and the DNCS. This connection is described in further detail in Chapter 2 of this document.

NTP Server Sites

NTP servers are an alternative to using the GPS for time synchronization. If a site is unable to use the GPS, they may elect to use an NTP server. NTP servers are located throughout the world and are accessible using the Internet.

In an NTP server configuration, the DNCS receives its time from an NTP server. This is as accurate as the GPS-based solution. The only drawback to using an NTP server is that the DNCS must have a reliable network connection to keep the system time accurate and up to date. The NTP server option has some added configuration complexity and the opportunity for a failure is increased. NTP server configuration is discussed in further detail in Chapter 3 of this document.

Network Time Protocol

The xntpd process on the DNCS synchronizes the DNCS to the configured time source. The Network Time Protocol daemon should *always* be running on the DNCS and the Application Server.

Important: The Application Server should always be running NTP, and in most cases, uses the DNCS as a reference.

Note: See Chapter 4, **DBDS System Time Maintenance**, for instructions on checking the Network Time Protocol daemon.

Pioneer Sites

Sites running Aptiv Digital's Passport application need to contact Aptiv Digital (formerly Pioneer) to ensure that the application server is synchronized with the DNCS clock.

DVR Recordings

Maintaining accurate system time on the DNCS helps ensure that scheduled recordings will start correctly for consumers with DVR set-tops.

Time Sources for Cisco Products and Services

The following table illustrates the time sources for optional products often used with the DBDS.

Product or Service	Time Source
Cisco Retriever server*	DNCS
Cisco SBIE server*	DNCS
Cisco Pointer server*	DNCS
Cisco AutoBackup server*	DNCS or NTP server
Cisco Disaster Recovery monitoring computer*	DNCS or NTP server
Basic Backup server	Basic Backup server internal hardware clock

* *When you verify your time setting on the DNCS or the NTP server, you also verify the time settings for these products.*

Chapter 2
Install and Configure the Digital System Time Kit to Use the Global Positioning System

Overview

Introduction

This chapter provides procedures for installing and configuring the Digital System Time Kit (part number 713703) to use the Global Positioning System (GPS) to manage system time. In addition, this chapter provides a procedure for verifying your time zone settings.

Contact your Cisco representative if you need to order a Digital System Time Kit.

Important: If you are currently using the GPS on your system, go to Chapter 4, **DBDS System Time Maintenance**, to verify and synchronize your system time settings (if necessary).

In This Chapter

This chapter contains the following topics.

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Verify Time Zone Settings

Introduction

Before installing the Digital System Time Kit, you must verify that the time zone setting and the current date and time is correct for your DNCS. This section provides a procedure for verifying your DNCS time zone setting and for updating the current date and time (if necessary).

Verifying the DNCS Time Zone Setting

Follow these steps to verify that the time zone setting is correct for your DNCS.

1. At the DNCS Administrative Console window, click the **DNCS** tab and then click the **Utilities** tab.

2. Click **xterm**.

    Result: The xterm window opens.

3. At the **$** prompt, type **date** and then press **Enter**.

    Result: The current date, time, and time zone of your DNCS displays on the screen.

    Example:

    Mon Jan 29 8:59:50 EST 2007

    - EST/EDT = Eastern Standard Time/Eastern Daylight Time
    - CST/CDT = Central Standard Time/Central Daylight Time
    - MST/MDT = Mountain Standard Time/Mountain Daylight Time
    - PST/PDT = Pacific Standard Time/Pacific Daylight Time
    - HST/HDT = Hawaii Standard Time/Hawaii Daylight Time

4. Is the time zone setting correct for your DNCS?

    - If **yes**, go to step 5.
    - If **no**, contace Cisco Services for assistance with correcting the time zone setting in your DNCS.

5. Does the date and time accurately match the current date and time?

    - If **yes**, go to step 7.
    - If **no**, go to step 6.

Continued on next page

6. Use the **date** command to set the system clock as accurately as possible to the current date and time using the following format:
date MMDDhhmm

Example: Type **date 01290900** and press **Enter** to change the time and date to **Mon Jan 29 09:00:00 EST 2007**.

7. Go to **Install the Digital System Time Kit**, next in this chapter.

Note: If you need to configure an NTP server, go to Chapter 3, **Configure an NTP Server**.

Install the Digital System Time Kit

Introduction

The Digital System Time Kit provides the components needed to connect the DNCS to the GPS. This connection enables the DNCS to synchronize to the GPS.

This section provides the following information and procedures:

- Digital System Time Kit components and other necessary equipment
- Wiring and connection diagrams
- Cable wire descriptions
- Installation and connection instructions

Digital System Time Kit Components

The following components are included in the Digital System Time Kit (part number 713703):

- Trimble Acutime-II Antenna Receiver, part number 560942
- Trimble Acutime-II Cable, 200-ft., part number 560941
- ADL 1901 Acutime II-to-RS-232 Converter Unit, part number 187687 (includes a 12 V DC 1 AMP power supply and a 6-ft DB-9 to DB-25 cable)

Additional Equipment Needed

To install the Digital System Time Kit, you also need the following equipment:

- Sufficient length of threaded rigid conduit pipe to obtain a clear view of the sky at the mounting bracket location. The threaded socket accepts a 1.00-in.—14 straight thread
- Mounting brackets to attach the pipe to a building or to another pole
- Choose one of the following options:
  - For a V440 or a V445 DNCS: Use the 6-ft DB–9–to–DB-9 straight-through extension cable (with one male end and one female end [part number 180143, supplied with the kit])
  - For a V880 or an E450 DNCS: Use a X985a DB-25 serial port splitter cable to connect the Digital System Time Kit to the DNCS

Important: If this DB-25 serial port splitter cable is not already connected to the port labeled **A/B** on the back panel of the V880 or the E450 DNCS, you must acquire and connect this cable before proceeding with the installation. You do not need the X985a serial port splitter cable for installing on an E250 DNCS.

Note: To purchase the X985a DB-25 serial port splitter cable, contact your Cisco North American Marketing Manager.

Install the Digital System Time Kit, Continued

Installation Overview Diagram

The following diagram provides an overview of a typical Digital System Time Kit installation.
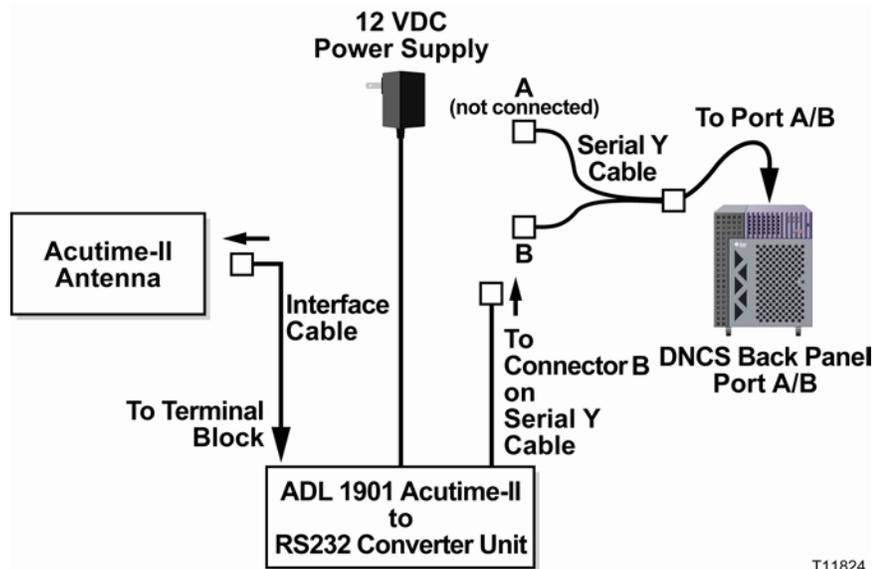
Trimming the Cable Wires

Before connecting the interface cable, strip the wire bundle sheath to expose about 4 inches of wires. The wires in the following diagram are the wires you need for the installation. Cut the remaining wires.
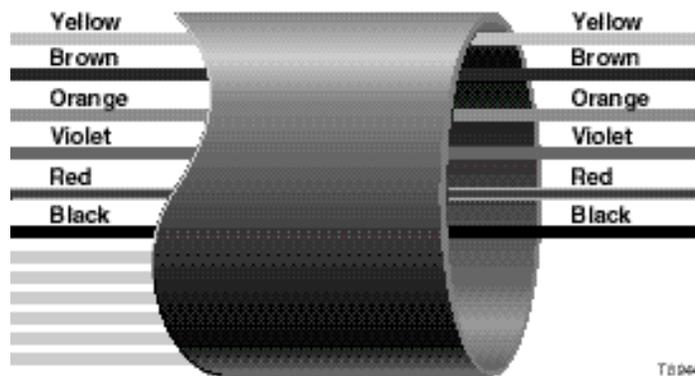
Install the Digital System Time Kit, Continued

Cable Wire Descriptions

The following table describes the wires bundled in the Trimble Acutime-II cable.

Wire Color	Signal Description	RS-232/RS-422 Converter
Yellow (Pin 5)	Port B: RS-422/Transmit +	Connects to RX +
Brown (Pin 4)	Port B: RS-422/Transmit -	Connects to RX -
Orange (Pin 3)	Port B: RS-422/Receive +	Connects to TX +
Violet (Pin 2)	Port B: RS-422/Receive -	Connects to TX -
Red (Pin 1)	DC Power (+9 to +32 V DC)	Connects to +12
Black (Pin 9)	DC Ground	Connects to GND
White		Cut (not used)
Gray		Cut (not used)
Green		Cut (not used)
Blue		Cut (not used)
Orange w/White Stripe		Cut (not used)
Black w/White Stripe		Cut (not used)

Wiring Diagram for Back Panel of ADL 1901–to–RS232 Converter Unit

The following diagram shows the back panel connecting ports of the ADL 1901–to–RS232 converter unit.
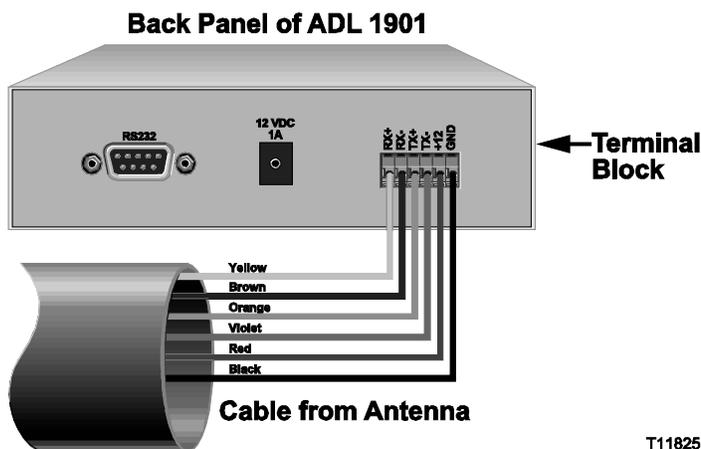
Install the Digital System Time Kit, Continued

Installing the Digital System Time Kit

Follow these steps to install the Digital System Time Kit.

1. Find a suitable **location** for the antenna receiver that has a clear view of the sky and can be reached from the DNCS with the interface cable.

2. If you are not attaching the antenna receiver to the roof of a building, install a sturdy pole that is high enough to have a clear view of the sky.

3. Attach the **mounting brackets** to the building or to the pole.

4. Attach the **threaded conduit pipe** to the antenna and the mounting bracket.

5. Route the **interface cable** between the antenna and the DNCS.

   Note: The signal plug end of the interface cable connects to the antenna receiver. The wire-lead end of the interface cable connects to the terminal block on the **ADL 1901** converter.

Establishing GPS to DNCS Connectivity

Follow these steps to establish connectivity from the GPS to the DNCS.

Important: You will have to restart the siManager and qamManager processes on the DNCS in order to complete this procedure.

1. Connect the **signal plug end** of the **interface cable** into the Acutime-II antenna receiver.

2. Before connecting the other end of the interface cable to the **ADL 1901** converter unit, complete these steps:

   a) Strip the wire bundle sheath to expose about 4 inches of wires.

   b) Cut the wires that are not going to be used.

   Important: Refer to **Cable Wire Descriptions** and **Trimming the Cable Wires**, earlier in this section.

3. Connect the stripped wire ends of the **interface cable** to the terminal block on the **ADL 1901** converter unit according to the connection requirements shown in the **Wiring Diagram for Back Panel of ADL 1901-to-RS232 Converter Unit** illustration and the **Cable Wire Descriptions** table, earlier in the section.

4. Is your DNCS an E450, V880, or V890?

   • If **yes**, go to step 5.

   • If **no**, go to step 6.

5. Check the back panel of the DNCS. Is the X985a DB-25 serial port splitter cable connected to the port labeled **A/B**?

   • If **yes,** go to step 7.

   • If **no,** connect the **serial port splitter cable** to the port labeled **A/B** on the back panel of the E450, V880, or V890. Then, go to step 7.

6. Is your DNCS an E250?

- If **yes**, using the supplied 6-foot DB-9–to–DB-25 cable, connect the **RS232 DB-9** port on the back panel of the **ADL 1901** converter to the port labeled **B** on the back panel of the E250 DNCS. Then, go to step 8.

- If **no**, using the supplied 6-foot DB-9–to–DB-9 extension cable, connect the **RS232 DB-9** port on the back panel of the **ADL 1901** converter to the port labeled **Serial TTYB** on the back panel of the V440 or V445 DNCS. Then, go to step 8.

7. Using the supplied 6-ft DB-9–to–DB-25 cable, connect the **RS232 DB-9** port on the back panel of the **ADL 1901** converter to port B on the **DB-25 serial port splitter cable**.

8. Connect one end of the **power supply cable** to the **12 VDC 1A** port of the ADL 1901 converter.

9. Plug in the other end of the **power supply cable** into the power outlet.

10. Open an xterm window on the DNCS and log in as **root** user, if you have not already done so.

11. At the root (#) prompt on the DNCS, type **ls –l /dev/refclock-1** and press **Enter**.

    Note: The last character in the command "/dev/refclock-1" is the number 1.

    Result: One the following results appears on the screen:

    - For E250, E450, and V880 systems:
      ```
      lrwxrwxrwx  1 root   root   45 May 22 2003 /dev/refclock-1
      -> /devices/pci@1f,4000/ebus@1/se@14,400000:b,cu
      ```
    - If refclock is missing:
      ```
      /dev/refclock-1: No such file or directory
      ```

12. Does your system display the "No such file or directory" message?

    - If **yes**, go to step 13.

    - If **no**, go to step 16.

13. Type **ln -s `ls -l /dev/cua/b | sed -e 's:^.*\.\./\.\.::'` /dev/refclock-**1 and press **Enter**.

    Important: The characters must be entered exactly as shown above or the link will not be correct.

14. Type **ls –l /dev/refclock-1** and press **Enter** to verify that the link is correct.

15.   Does your system *still* display the "No such file or directory" message?

- If **yes**, contact Cisco Services for further assistance. See Chapter 7, **Customer Information**, to locate an assistance center in your area.

- If **no**, go to step 16.

16.   Type **/etc/rc2.d/S99xntpd stop** and press **Enter**.

Result: The system stops the S99xntpd process and displays the command prompt.

17.   Type **/etc/rc2.d/S99xntpd start** and press **Enter**.

Result: The system restarts the S99xntpd process and displays the command prompt.

18.   Type **exit** and press **Enter** to exit as root user.

19.   To verify the time and date, type **date** and press **Enter**.

20.   Is the DNCS clock set to within 16 minutes of the correct time?

- If **yes**, perform the procedures found in **Verifying DNCS Connectivity** in the **DBDS System Time Synchronization Maintenance** section of Chapter 4. Then, go to step 21 of this procedure.

- If **no**, go to Chapter 4, **DBDS System Time Maintenance**, and perform the procedures in that chapter. Then, repeat this procedure from step 10.

21.   Wait approximately 15 minutes; then, verify that the DNCS is using the GPS as the clock reference.

Important: In order to verify that the DNCS is using the GPS as the clock reference, go to **Verify the Installation Using the Doctor Report**, next in this chapter.

22.   Stop and then restart the siManager and qamManager processes on the DNCS. Then, return to step 21 of this procedure.

Note: See Chapter 5, **Reset System Processes**, for detailed procedures on stopping and restarting the siManager and qamManager processes on the DNCS.

Verify the Installation Using the Doctor Report

Introduction

This section provides an easy way to verify that the DNCS is using the GPS as the clock reference and that your DHCT time zone settings are synchronized to the hub.

To verify the system time settings, run the Doctor Report. The Doctor Report provides the following information:

- Time setting of the DNCS
- Time differences between the DNCS and the Application Server (if any)
- Time synchronization source from which the DNCS and the Application Server get their times (NTP server or GPS)

Running the Doctor Report

Follow these steps to run the Doctor Report.

1. Click the **DNCS** tab from the DNCS Administrative Console window; then, click the **Utilities** tab.

2. Click **xterm**.

   Result: The xterm window opens.

3. In the xterm window, type **cd /export/home/dncs/doctor** and then press **Enter**.

   Result: The /export/home/dncs/doctor directory is now the working directory.

   Notes:

   - You may want to expand the xterm window to be able to see more of the report without having to scroll as much.

   - If you cannot run the Doctor program, or if you do not have it, contact Cisco Services.

4. Type **doctor –tv** and then press **Enter**.

   Result: A report similar to the following appears. The appearance and contents of the report will vary according to your system release version.

5. Does the Doctor Report show **Local** as the DNCS NTP synchronization source?

   • If **yes**, go to **Establishing GPS to DNCS Connectivity** in the **Install the Digital System Time Kit** section, earlier in this chapter, and complete steps 10 through 22. Then, repeat this procedure from step 1.

   • If **no**, go to step 7.

6. Does the Doctor Report still list an error with the DNCS NTP synchronization source?

   • If **yes**, contact Cisco Services for further assistance.

   • If **no**, go to step 7.

7. Does the Doctor Report list dncsatm as the NTP synchronization source for the Application Server?

   • If **yes**, go to step 8.

   • If **no**, go to **Verifying Application Server Synchronization** in the **DBDS System Time Synchronization Maintenance** section of Chapter 4, and perform the procedures in that section. Then, repeat this procedure from step 1.

   Note: Ignore errors relative to the Application Server at sites that run the Pioneer resident application.

8. Does the Doctor Report show that the DNCS NTP synchronization source is ***GENERIC** and the App Server NTP synchronization source is ***dncsatm**?

    - If **yes**, go to Chapter 6, **Pay-Per-View Events** to verify your PPV events.

    - If **no**, call Cisco Services. See Chapter 7, **Customer Information**, to locate an assistance center in your area.

9. Type **exit** and press **Enter** to close the xterm window.

10. Go to Chapter 4, **DBDS System Time Maintenance**.

Chapter 3
Configure an NTP Server

Overview

Introduction

This chapter provides procedures for configuring an NTP server on your system. In addition, this chapter provides a procedure for verifying your time zone settings.

Important: If you are currently using an NTP server on your system, go to Chapter 4, **DBDS System Time Maintenance**, to verify and synchronize your system time settings (if necessary).

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Verify Time Zone Settings

Introduction

Before configuring an NTP server, you must verify that the time zone setting and the current date and time is correct for your DNCS. This section provides a procedure for verifying your DNCS time zone setting and for updating the current date and time (if necessary).

Verifying the DNCS Time Zone Setting

Follow these steps to verify that the time zone setting is correct for your DNCS.

1. At the DNCS Administrative Console window, click the **DNCS** tab and then click the **Utilities** tab.

2. Click **xterm**.

    Result: The xterm window opens.

3. At the **$** prompt, type **date** and then press **Enter**.

    Result: The current date, time, and time zone of your DNCS displays on the screen.

    Example:

    Mon Jan 29 8:59:50 EST 2007

    - EST/EDT = Eastern Standard Time/Eastern Daylight Time
    - CST/CDT = Central Standard Time/Central Daylight Time
    - MST/MDT = Mountain Standard Time/Mountain Daylight Time
    - PST/PDT = Pacific Standard Time/Pacific Daylight Time
    - HST/HDT = Hawaii Standard Time/Hawaii Daylight Time

4. Is the time zone setting correct for your DNCS?

    - If **yes**, go to step 5.
    - If **no**, contact Cisco Services for assistance with correcting the time zone setting in your DNCS.

5. Does the date and time accurately match the current date and time?

    - If **yes**, go to step 7.
    - If **no**, go to step 6.

6.   Use the **date** command to set the system clock as accurately as possible to the current date and time using the following format:
date MMDDhhmm

    Example: Type **date 01290900** and press **Enter** to change the time and date to **Mon Jan 29 09:00:00 EST 2007**.

7.   Go to **Configure an NTP Server**, next in this chapter.

Configure an NTP Server

Introduction

NTP servers are an alternative to using the GPS for system time synchronization. If a site is unable to use the GPS, they may elect to use an NTP server. NTP servers are located throughout the world and are accessible using the Internet. This section contains procedures for installing, verifying, and monitoring an NTP server on the DNCS.

You can choose to utilize a single NTP server or multiple NTP servers. With multiple NTP servers, the NTP daemon queries all the NTP sources. The delay between the sources is calculated and the NTP daemon averages them out to obtain an accurate time. If one NTP server becomes unresponsive, the NTP daemon does not use it to calculate time. When the unresponsive server returns to service, the NTP daemon will once again use it to calculate time.

Before You Begin

To configure your DNCS to use an NTP server, you will first need to identify an NTP server. Then, you will need to work with your Network Administrator to configure the DNCS to communicate with that time server.

You should also configure an additional NTP server in the unlikely event that you lose communication with the primary NTP server (usually the VPN connection) for an extended period of time. To configure an additional NTP server, locate an NTP server and verify the network connectivity and status of the server using the **ntpdate** command and the IP address of the additional server. Then, add the entry to both the /etc/hosts file and the NTP configuration file as you configure your primary NTP server.

Locating an NTP Server

The easiest NTP server to use is the router that is set up for VPN access to the DNCS. Alternatively, there are many places to find NTP servers. A good place to start is the following URL: **http://ntp.isc.org/bin/view/Servers/StratumOneTimeServers**. Or, you can access the parent site of the previous URL at **http://www.ntp.org** to locate an alternate NTP server.

Note: You need to add entries to the /etc/hosts file to allow the DNCS to resolve the name.

Installing an NTP Server

Complete these steps to install an NTP server on your system.

1. Obtain the IP address of the NTP server to be used for the DNCS.

    Important: The DNCS *must* have a network connection to the NTP server in order to receive time messages from the NTP server.

2. Click the **DNCS** tab from the DNCS Administrative Console window; then click the **Utilities** tab.

3. Click **xterm.**

    Result: The xterm window opens.

4. Verify network connectivity and the status of each NTP server from the DNCS. Type the following and press **Enter**:

    $ /usr/local/xntpd/ntpdate –d 192.168.2.20
    $ /usr/local/xntpd/ntpdate –d 132.163.4.102

    Notes:

    - For the purpose of this document, we are using the IP address **192.168.2.20** as the NTP server. This IP address is the default IP address of the Cisco Services VPN connection. If you have a Cisco VPN connection, the Cisco VPN router can serve as your time source.

    - The second IP address listed above is the IP address for an actual NTP server.

    Result: The system should respond with both transmit and receive packets followed by time information sent from the NTP server. If the final line of output states "no server suitable for synchronization found," then either a problem exists with that NTP server or a network issue is preventing a connection. Verify the IP address with your Network Administrator and attempt the command listed above again. If you are unable to resolve this problem, check your network routing. If you are *still* unable to resolve this problem, contact Cisco Services for assistance.

    Important: Do not proceed to step 5 until you are able to communicate with the NTP server.

5. Log in as **root** user and use the UNIX vi editor to insert a line for each additional NTP server at the end of the /etc/hosts file:

    192.168.2.20   NTPserver1
    132.163.4.102   NTPserver2

    Notes:

    - The first IP address shown is the address typically used for the VPN router. Use this address or the IP address supplied by your Network Administrator.

    - You can also include additional NTP server entries in the /etc/hosts file.

    Result: The DNCS will now recognize the NTP server(s) by both server name(s) (NTPserver1 and NTPserver2) and by IP address(es).

6.   From the xterm window, type the following and press **Enter**:

   #cd /etc/inet

   Result: The /etc/inet directory is now the new working directory.

7.   To create a backup of the NTP configuration file, type the following and press **Enter**:

   cp ntp.conf ntp.conf.bak

   Result: The system creates a backup of the ntp configuration file named ntp.conf.bak.

8.   At the # prompt, use the UNIX vi editor to edit the **ntp.conf** file so that the first lines contain an entry for each NTP server that you choose to use.

   Example:

   server 192.168.2.20 *or* **server NTPserver1**
   server 132.163.4.102 *or* **server NTPserver2**

   Note: Simply replace the IP address with the NTP server name defined in the hosts file.

   Results:

   •   The DNCS is now configured to use an NTP server as the main time source.

   •   An additional (backup) NTP server is also configured on the DNCS.

9.   **Save** the ntp.conf file and exit the editor.

10. Complete steps 1 through 6 of the **Verifying Application Server Synchronization** procedure in the **DBDS System Time Synchronization Maintenance** section of Chapter 4. Then, return to step 11 of this procedure.

11. Your next step is to stop and restart (bounce) the S99xntpd process. Go to **Stop and Restart the X99xntpd Process**, next in this chapter.

Stop and Restart the S99xntpd Process

Introduction

After you change the ntp.conf file, you must stop and restart (bounce) the S99xntpd process for the system to recognize and implement your changes.

Important: Bouncing the S99xntpd process will not impact the DNCS or subscriber cable services.

Bouncing the S99xntpd Process

Complete these steps to bounce the S99xntpd process.

1. Use the xterm window to log in as **root** user, if you have not already done so.

2. Type **/etc/rc2.d/S99xntpd stop** and press **Enter**.

   Result: The system stops the S99xntpd process and displays the command prompt.

3. Type **/etc/rc2.d/S99xntpd start** and press **Enter**.

   Result: The system restarts the S99xntpd process and displays the command prompt. Your next step is to run the Doctor Report as described in the next section to verify that the connection with the NTP server has been re-established.

4. Type **exit** and press **Enter** to exit as root user.

5. Go to **Verify and Monitor NTP Server Configuration and Connection**, next in this chapter.

Verify and Monitor NTP Server Configuration and Connection

Introduction

After you bounce the S99xntpd process, run the Doctor Report to verify that the system has a configuration and connection to the NTP server. This section provides the procedure for verifying and monitoring the NTP server configuration and connection.

The Doctor Report provides the following information:

- Time setting of the DNCS
- Time differences between the DNCS and the Application Server (if any)
- Time synchronization source from which the DNCS and the Application Server get their times (NTP server or GPS)

Verifying and Monitoring the NTP Server Configuration and Connection

Complete these steps to verify and monitor the NTP server configuration and connection.

Important: Wait approximately 15 minutes after bouncing the S99xntpd process to perform this procedure to give the server time to synchronize with the DNCS.

1. Click the **DNCS** tab from the DNCS Administrative Console window; then, click the **Utilities** tab.

2. Click **xterm**.

    Result: The xterm window opens.

3. In the xterm window on the DNCS, type **cd /export/home/dncs/doctor** and press **Enter**.

    Result: The /export/home/dncs/doctor directory is now the working directory.

    Notes:

    - You may want to expand the xterm window to be able to see more of the report without having to scroll as much.

    - If you cannot run the Doctor program, or if you do not have it, contact Cisco Services.

4. Type **doctor -tv** and press **Enter**.

   Result: A report similar to the following appears. The appearance and contents of the report will vary according to your system release version.

   ```
   System Name
   Fri Apr 16 08:48:52 EDT 2005  ◄──  This is the time
                                       setting of the DNCS.
   DNCS/App Server Time Sync
   ================================================

   OK: DNCS and App Server time difference = 0 seconds.
   DNCS NTP process                    : ntpd
   DNCS NTP synchronization source     :*192.168.41.253 ◄──
   App Server NTP process              : ntpd
   App Server NTP synchronization source :*dncsatm ◄──
   ```

   The asterisk (*) in front of an IP address, a URL, or a server name indicates that the DNCS is synchronized with an NTP server.

   The asterisk (*) in front of *dncsatm* indicates that the Application Server is synchronized with the DNCS. **Note:** An asterisk (*) in front of *Local* indicates that the GPS or the NTP server is not functioning correctly.

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5. Does the DNCS NTP synchronization source parameter show an asterisk (*) in front of an IP address, a URL, or a server name for the NTP time server?

   • If **yes**, the clock is synchronized to the *NTP server*, go to step 6.

   • If **no**, the clock is synchronized to the *GPS clock* or *Local*, and this procedure has failed. Repeat the procedures in this chapter to verify that the NTP server is configured correctly. If you continue to have difficulty, contact Cisco Services.

6. Does the Doctor Report list dncsatm as the NTP synchronization source for the Application Server?

   • If **yes**, go to step 7.

   • If **no**, go to **Verifying Application Server Synchronization** in the **DBDS System Time Synchronization Maintenance** section of Chapter 4, and perform the procedures in that section. Then, repeat this procedure from step 1.

   Note: Ignore errors relative to the Application Server at sites that run the Pioneer resident application.

7. Type **exit** and press **Enter** to close the xterm window.

8. Go to Chapter 4, **DBDS System Time Maintenance**.

Chapter 4
DBDS System Time Maintenance

Overview

Introduction

This chapter provides procedures for maintaining proper system time synchronization on your system. System time synchronization maintenance is important year round, not just during the scheduled seasonal time changes. Cisco recommends that you incorporate the procedures in this chapter into your routine maintenance schedule.

In This Chapter

This chapter contains the following topics.

DBDS System Time Synchronization Maintenance

Introduction

This section provides the procedure to confirm that the DNCS NTP process is working correctly.

Verifying DNCS xntpd Operation

Follow these steps to verify operation of the DNCS xntpd.

1. From the DNCS xterm window type **ps –ef | grep ntp** and then press **Enter**.

2. Look at the right-hand area of the xterm: DNCS window. Does the display on your window include /usr/local/xntpd or /usr/local/*bin*/xntpd?


```
xterm                                                              _ □ ×
dot:/export/home/dncs$ > ps -ef | grep ntp
    dncs 25445 25395  0 09:46:19 pts/7     0:00 grep ntp
    root   486    1  0   Apr 25 ?          0:00 /usr/local/xntpd/ntpd -c /etc/inet/ntp.conf
-p /etc/ntp.pid -l /var/adm/log/ntp
dot:/export/home/dncs$ > █
```

- If **yes**, the DNCS is running xntpd. Go to **Verifying DNCS Connectivity**, later in this section.
- If **no**, go to **Starting the xntpd process**, next in this section.

Starting the xntpd process

Important: The DNCS must be running properly before you perform this procedure.

Follow these steps to start the xntpd process and to synchronize the Application Server time with the DNCS time.

1. In a DNCS xterm window, log in as a **root** user.

2. Type the following and press **Enter**:

    cp /var/adm/log/ntp.log /var/adm/log/ntp.log.bak

    Result: The system saves a backup of the ntp.log file.

3. Type **/etc/rc2.d/S99xntpd start** and press **Enter.**

    Note: The start-up process takes approximately 15 to 30 seconds to complete.

4. To verify that the DNCS is running xntpd, type **ps –ef | grep ntp** and then press **Enter**.

5. Look at the right-hand area of the xterm: DNCS window. Does the display on your window include /usr/local/xntpd or /usr/local/*bin*/ xntpd?
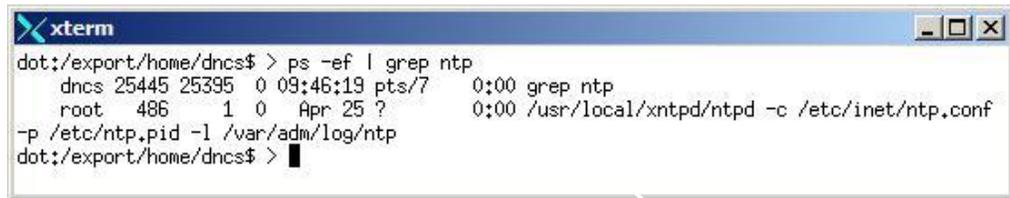
- If **yes**, the DNCS is running xntpd. Go to step 6.

- If **no**, contact Cisco Services for assistance.

6. Notify Cisco Services that you had to restart the xntpd process on your DNCS so that Cisco Services can begin to diagnose why the xntpd process stopped.

7. Type **exit** and then press **Enter**.

8. Go to **Verifying DNCS Connectivity**, next in this section.

DBDS System Time Synchronization Maintenance, Continued

Verifying DNCS Connectivity

This section provides a procedure for running the Network Time Protocol Query (NTPQ) on the DNCS to verify that the DNCS is synchronized to the correct timing source.

Note: You can also verify the DNCS connectivity by reading the ntp.log file located in the /var/adm/log/ directory. The log file should indicate that the xntpd process is synchronized to the correct timing source (NTP server or GPS).

Follow these steps to run the NTPQ on the DNCS to verify that the DNCS is synchronized to the correct timing source.

1. From a DNCS xterm window type **/usr/local/xntpd/ntpq** and press **Enter**.

2. Does the ntpq> prompt appear on your screen?

    - If **yes**, go to step 3.

    - If **no**, contact Cisco Services for assistance.

3. At the ntpq> prompt, type **peers** and then press **Enter**.

    Result: A result similar to one of the following examples appears on the screen.

    Note: The appearance and contents of the result will vary according to your system release version.

    GPS Example

```
ntpq> peers
     remote           refid      st t when poll reach   delay    offset  jitter
==============================================================================
*GENERIC(1)      .GPS.           0 l   44   64  377   0.000   -4.482  4000.00
 LOCAL(0)        .LCL.           0 l   43   64  377   0.000    0.000   0.008
```

    NTP Server Example

```
ntpq> peers
     remote           refid       st t when poll reach   delay   offset  jitter
==============================================================================
*192.168.41.253 130.207.244.240  2  u  962 1024  377    1.785   -0.221   0.174
 GENERIC(1)      .GPS.            0  l    -   64    0    0.000    0.000 4000.00
 LOCAL(0)        LOCAL(0)        10  l   32   64  377    0.000    0.000   0.008
```

    Notes:

    - The asterisk (*) in front of GENERIC (as shown in the above example) indicates that the DNCS is using the GPS as a reference for clock information, and that the DNCS is synchronized to the GPS.

    - If the asterisk (*) is in front of an IP address, a URL, or a server name (as shown in the above example), this indicates that the DNCS is using an NTP server as a reference for clock information, and that the DNCS is synchronized to the NTP server.

    Important: If the asterisk (*) is in front of LOCAL, then the DNCS is not synchronized to the GPS or the NTP server. It is synchronized with the hardware clock on the server. This situation must be corrected immediately.

4. Is there an asterisk (*) in front of LOCAL?

    - If **yes**, go to step 5.
    - If **no**, go to step 13.

5. At the ntpq > prompt, type **lass** and then press **Enter**.

    Result: A result similar to one of the following examples appears on the screen.

    Notes:

    - The appearance and contents of the result will vary according to your system release version.
    - The device numbers listed in the first column of the following output examples correspond with the devices listed in the **ntpq> peers** output examples in step 3 of this procedure.

    GPS Example

```
ntpq> lass
ind  assID status  conf  reach  auth   condition  last_event   cnt
==================================================================
1    30252  8000   yes   yes    none     reject
2    30253  9614   yes   yes    none   sys.peer    reachable    1
```

    NTP Server Example

```
ntpq> lass
ind  assID status  conf  reach  auth   condition  last-event   cnt
==================================================================
 1   62716  9614   yes   yes    none   sys.peer   reachable     1
 2   62717  8000   yes   yes    none    reject
 3   62718  9014   yes   yes    none    reject    reachable     1
```

6. Does the output displayed indicate that the GPS or NTP server is **reachable**?

    - If **yes**, verify that the system time is correct using the **date** command. Then, go to step 7.
    - If **no**, go to step 9.

7. Is the system time incorrect by more than 2 minutes?

    - If **yes,** contact Cisco Services.
    - If **no**, use the **date** command to update the system time.

8. Repeat steps 3 through 6. Did you receive an acceptable result?

    - If **yes**, go to step 13.
    - If **no,** contact Cisco Services for assistance.

9. If the GPS or the NTP server is not reachable, select one of the following options:

    - If you are using the GPS, check the physical hardware connections between the DNCS and the GPS. See the **Establishing GPS to DNCS Connectivity** procedure in the **Install the Digital System Time Kit** section of Chapter 2 for further details.

    - If you are using an NTP server, troubleshoot the communication link between the DNCS and the NTP server.

10. Use the **date** command to verify the current system time. Then, go to step 11.

11. Repeat steps 3 through 6. Did you receive an acceptable result?

    - If **yes**, go to step 12.

    - If **no**, contact Cisco Services for assistance.

12. After performing the procedures in this section, did the DNCS time change by more than 2 minutes?

    - If **yes**, reset the siManager and qamManager processes. Go to Chapter 5, **Reset System Processes** for detailed procedures. Then repeat the procedures in this section.

    - If **no**, go to step 13.

13. To exit, type **q** and then press **Enter**.

14. Did you come here from step 20 of the **Establishing GPS to DNCS Connectivity** procedure in the **Install the Digital System Time Kit** section in Chapter 2?

    - If **yes**, return to step 21 of that procedure.

    - If **no**, go to step 15.

15. Go to **Verifying Application Server Synchronization**, next in this section.

Verifying Application Server Synchronization

Follow these steps to run the ntpq script on the Application Server to verify that the Application Server is synchronized with the DNCS.

1. From an xterm window on the Application Server, type **/usr/local/xntpd/ntpq** and press **Enter**.

2. Does the ntpq> prompt appear on your screen?

    - If **yes**, go to step 3.

    - If **no**, contact Cisco Services for assistance.

3. At the ntpq> prompt, type **peers** and then press **Enter**.

    Result: A window similar to the following example appears on the screen.

    ```
    ntpq> peers
         remote    refid          st t when poll reach   delay   offset  jitter
    ==============================================================================
    *dncsatm   192.168.41.253  3 u  653  1024  377     0.611    0.860   0.586
    ntpq>
    ```

    Notes:

    - The asterisk (*****) in front of dncsatm indicates that the Application Server is synchronized to the DNCS.

    - If the DNCS is using an NTP server as a time source (as shown in the above example), the IP address, URL, or server name of that NTP server will be displayed in the refid column.

    - If the Application Server is synchronized to a DNCS that is synchronized to the GPS source, .GPS will be displayed in the refid column.

4. Is there an asterisk (*) in front of dncsatm on your screen?

    - If **yes**, your Application Server is synchronized to the DNCS. Go to step 5.

    - If **no**, go to **Verifying the Application Server xntpd Operation** in the **Synchronize System Component Time Settings** section, next in this chapter. Then, repeat this procedure.

5. To exit ntpq, type **q** and then press **Enter**.

6. Type **exit** and press **Enter** to close the xterm window.

7. Go to **DBDS Time Zone/Day Light Savings Time Operation**, later in this chapter.

Synchronize System Component Time Settings

Introduction

For your system to operate properly, you must synchronize the Application Server with the DNCS. This section provides instructions for verifying that the system component times are synchronized.

Verifying the Application Server xntpd Operation

Follow these steps to verify operation of the Application Server xntpd.

1. Open an additional xterm window on the Application Server.

2. To verify that the Application Server is running xntpd, type
    ps –ef | grep ntp and then press **Enter**.

3. Look at the right-hand area of the xterm: App Server window. Does the display on your window include /usr/local/xntpd?
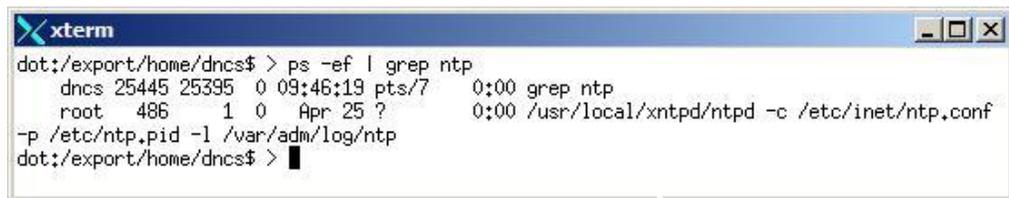

```
dot:/export/home/dncs$ > ps -ef | grep ntp
    dncs 25445 25395  0 09:46:19 pts/7    0:00 grep ntp
    root   486     1  0  Apr 25 ?         0:00 /usr/local/xntpd/ntpd -c /etc/inet/ntp.conf
-p /etc/ntp.pid -l /var/adm/log/ntp
dot:/export/home/dncs$ > █
```

- If **yes**, the Application Server is running xntpd. Contact Cisco Services for assistance.

- If **no**, go to **Starting the xntpd process**, next in this section.

Starting the xntpd process

Important: The Application Server must be running properly before you perform this procedure.

Follow these steps to start the xntpd process and to synchronize Application Server time with the DNCS.

1. Log in as a **root** user.

2. Type **cd /etc/rc2.d** and then press **Enter.**

    Result: The /etc/rd2.d directory is now the working directory.

3. Type **/usr/local/xntpd/ntpdate dncsatm** and press **Enter**.

    Note: The ntpdate dncsatm command synchronizes the Application Server time with the DNCS.

4. Type **./S99xntpd start** and then press **Enter**.

    Notes:

    *   Be sure to type the period before typing **/S99xntpd**.

    *   The start-up process takes approximately 15 to 30 seconds to complete.

5. To verify that the Application Server is running xntpd, type
    ps –ef | grep ntp and then press **Enter**.

6. Look at the right-hand area of the xterm: App Server window. Does the display on your window include /usr/local/xntpd?

    *   If **yes**, the Application Server is running xntpd. Go to step 7.

    *   If **no**, contact Cisco Services for assistance.

7. In the xterm window type **exit** and then press **Enter**.

8. Repeat steps 1 through 4 of the **Verifying Application Server Synchronization** procedure, earlier in this chapter, to verify that the Application Server is synchronized with the DNCS.

DBDS Time Zone/Daylight Savings Time Operation

DBDS Time Zone/DST Operation Options

The Timezone and Daylight Savings Time options that are available on the DBDS allow you to specify time zone and DST settings per hub. Refer to the *Daylight Saving Time Configuration Guide* for information on these options.

Chapter 5
Reset System Processes

Overview

Introduction

If you adjusted the DNCS time or if the time difference is greater than 2 minutes, you must reset *both* the siManager and the qamManager processes on the DNCS. This chapter provides procedures for resetting these processes.

Important: During the time that the siManager and the qamManager processes are recovering, set-tops will not boot and QAM devices will be unable to build sessions.

In This Chapter

This chapter contains the following topics.

Topic	See Page
Reset siManager	5-2
Reset qamManager	5-4

Reset siManager

Introduction

This section provides a procedure for resetting the siManager process on the DNCS.

Note: The DNCS automatically updates the time on each device when the siManager and qamManager processes start, and then the DNCS updates the time every 12 hours after that.

Important: Perform the procedures in this section immediately after you adjust the time synchronization.

Resetting the siManager Process

This section provides the procedures for resetting the siManager process on the DNCS.

Note: Resetting the siManager process involves stopping and then restarting the process. This is also known as "bouncing" the process.

Stopping the siManager Process

Follow these steps to stop the siManager process on the DNCS.

1. From the DNCS Administrative Console Status window, click **Control** from the **DNCS** section. The DNCS Control window opens.

2. Select **siManager**, click **Process**, and then select **Stop Process**. A confirmation window opens.

3. Click **Yes** to stop the siManager process. After a few moments, a red icon appears next to the siManager that indicates the process has stopped running.

   Note: Several other processes may also turn yellow while siManager is stopped. This does not indicate a problem.

Restarting the siManager Process

Follow these steps to restart the siManager process on the DNCS.

1. In the DNCS Control window, select **siManager**.

2. Click **Process**, and then select **Start Process**. The indicator next to the siManager process changes to yellow and then to green to indicate that the process is active and running.

Reset qamManager

Resetting the qamManager Process

This section provides the procedures for resetting the qamManager process on the DNCS.

Note: Resetting the qamManager process involves stopping and then restarting the process. This is also known as "bouncing" the process.

Stopping the qamManager Process

Follow these steps to stop the qamManager process on the DNCS.

1. From the DNCS Administrative Console Status window, click **Control** from the **DNCS** section. The DNCS Control window opens.

2. Select **qamManager**, click **Process**, and then select **Stop Process**. A confirmation window opens.

3. Click **Yes** to stop the qamManager process. After a few moments, a red icon appears next to the qamManager that indicates the process has stopped running.

Restarting the qamManager Process

Follow these steps to restart the qamManager process on the DNCS.

1. In the DNCS Control window, select **qamManager**.

2. Click **Process**, and then select **Start Process**. The indicator next to the qamManager process changes to yellow and then to green to indicate that the process is active and running.

Chapter 6
Verify Pay-Per-View Events

Overview

Introduction

After you have bounced your system processes, or when the seasonal time changes are about to occur, you should verify your Pay-Per-View (PPV) event schedule. This chapter serves as a reference for the actual start times of PPV events scheduled.

In This Chapter

This chapter contains the following topics.

Topic	See Page
Verify Pay-Per-View Events	6-2

Verify Pay-Per-View Events

Scheduling PPV Events

PPV events scheduled between 2:00 a.m. local time and the variable times at which the PPV content providers adjust their clocks may not start at the correct time. We suggest that you contact the PPV content providers for more information about their time change schedules.

Note: If you choose to keep PPV events running during the time change and the events do not begin at the correct time, then the PPV event time can sometimes be adjusted in the PPV Event window. This is dependent on the advertising windows and other defined parameters related to that particular event. Therefore, it is recommended that you do not offer PPV events that bridge the 2:00 a.m. time change.

PPV Events Defined from the DNCS

If you define PPV events from the DNCS Admin Console, then the scheduling of events during the time change is location-specific and is based upon the offset from GMT for that site. The GMT times shown in the following tables are for U. S. Eastern time; they will vary based on your GMT offset. (The Billing Operations Support System [BOSS] interface uses GMT.)

Fall Time Change

PPV events scheduled to start between 01:00–01:59 DST actually start between 01:00–1:59 Standard Time.

Local Time		GMT
DST	11:00 – 11:59 p.m.	3:00 – 3:59 a.m.
	12:00 – 12:59 a.m.	4:00 – 4:59 a.m.
	1:00 – 1:59 a.m. ←	5:00 – 5:59 a.m. ←
Standard Time	1:00 – 1:59 a.m. ←	6:00 – 6:59 a.m. ←
	2:00 – 2: 59 a.m.	7:00 – 7:59 a.m.
	3:00 – 3:59 a.m.	8:00 – 8:59 a.m.

Events defined from the DNCS to start at this time, will actually start at this time.

Spring Time Change

PPV events scheduled to start between 02:00–02:59 are automatically adjusted to start between 03:00–03:59 DST.

	Local Time	GMT
Standard Time	11:00 – 11:59 p.m.	4:00 – 4:59 a.m.
	12:00 – 12:59 a.m.	5:00 – 5:59 a.m.
	1:00 – 1:59 a.m.	6:00 – 6:59 a.m.
DST	3:00 – 3:59 a.m. ←	7:00 – 7:59 a.m. ←
	4:00 – 4:59 a.m.	8:00 – 8:59 a.m.
	5:00 – 5:59 a.m.	9:00 – 9:59 a.m.

Events scheduled for 2:00 a.m. – 2:59 a.m. are automatically adjusted to start at this time.

PPV Events Defined from the Billing System

If PPV events are scheduled from the billing system, contact your billing system vendor to determine how their system handles the time surrounding the time change. The DNCS billing interface uses GMT, which does not adjust for DST. As a result, events will run at the time set by the billing system vendor.

Unforeseen Issues

If any unforeseen issues arise from the fall or spring time changes, contact Cisco Services. Have the following information readily available when you call:

- The system release on which your system in currently running
- Whether the problem is system wide or subscriber specific
- On which hub(s) the problem is occurring

Important: Go to Chapter 7, **Customer Information**, for more information.

Chapter 7
Customer Information

Overview

Introduction

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

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