



# Introduction

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This chapter provides an overview of the different components of IP/TV and describes how IP/TV Content Manager, in particular, works. This chapter contains the following sections:

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## About IP/TV

IP/TV is a network-based application that delivers live or prerecorded, on-demand or scheduled programs to an unlimited number of users over any IP-based local- or wide-area network. Synchronized presentations and screen captures are also supported, in addition to a wide range of video management functions.

As part of the Cisco Content Networking family, IP/TV is a turnkey solution that brings movie-quality video over enterprise networks to the desktop of the user, eliminating the need for dedicated video cabling, monitors, or special viewing rooms. Designed with respect to scalability, high-quality broadcasts are delivered safely across large enterprises.

Applications for IP/TV include broadcast TV to the desktop, video on demand, computer-based training, distance learning, corporate communications, manufacturing process monitoring, and surveillance systems.

IP/TV Version 3.4 supports a wide variety of audio and video formats, including Moving Picture Experts Group (MPEG-1), MPEG-2, Microsoft MPEG-4, ISO MPEG-4, and H.261.

To view a 7-minute video that describes IP/TV capabilities, click **Introduction Video** on the Cisco IP/TV Installer CD.

## IP/TV Components

IP/TV consists of three separate components: IP/TV Viewer, IP/TV Content Manager, and IP/TV Server.

IP/TV Viewer is the client component and is available as software only. Both IP/TV Content Manager and IP/TV Server components are available either as a software-only option or as a hardware appliance. As a software-only option, these components must be run on third-party PC systems that meet the minimum requirements of the specific IP/TV component.

As a hardware appliance, they are part of the Cisco IP/TV 3400 Series Server hardware. Each 3400 Server type has preinstalled IP/TV software.

- Archive and Broadcast Servers—IP/TV Server software
- Control Server—IP/TV Content Manager software (IP/TV StreamWatch software provided)
- Starter Server—IP/TV Server and IP/TV Content Manager software



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**Note**

Both Archive and Broadcast Servers have IP/TV Server software preinstalled, but only the Broadcast Server has a video capture card for live encoding and serving.

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Refer to the *Cisco IP/TV 3400 Series Servers User Guide* for more information on server hardware configuration and setup.

## IP/TV Viewer

IP/TV Viewer resides on the client and lets you view programs. A program is an audio, video, or text transmission over the network. IP/TV Viewer has a customizable user interface that displays a list of scheduled and on-demand programs. IP/TV Viewer allows you to subscribe to any of the listed programs, and plays the program at the scheduled or requested time. You can also browse among all currently running programs.

IP/TV Viewer obtains program information from IP/TV Content Manager, and displays programs served by IP/TV Server or other servers. It can also display programs multicast from the Multicast Backbone (MBone) of the Internet or from other servers that transmit in MBone-compatible format.

IP/TV Viewer can run as a standalone application, a helper application activated by a web browser, or a browser plug-in. It is available as software only and runs on Windows 98, Windows 2000, Windows NT 4.0, and Windows XP.

Refer to the *Cisco IP/TV Viewer User Guide* for more information on how to install and use IP/TV Viewer.

## IP/TV Content Manager

IP/TV Content Manager is accessed from a browser and is used by the system administrator or broadcast administrator to set up and manage IP/TV scheduled or on-demand programs, channels, recordings, and file transfers among IP/TV servers.

The IP/TV Content Manager component is available as software only or comes preinstalled on a Cisco IP/TV 3400 Series Server hardware appliance (Control Server).

IP/TV Content Manager runs on Windows 2000 and Windows NT 4.0. You can access IP/TV Content Manager from Netscape 4.5x through 4.7x, or Microsoft Internet Explorer 5.x or later. The browser must have support for Java and JavaScript enabled.

This guide provides information on how to create scheduled and on-demand programs. Refer to the *Cisco IP/TV Administration and Configuration Guide* for information on how to install, configure, and administer IP/TV Content Manager.

## IP/TV Server

IP/TV Server, which is controlled by IP/TV Content Manager, serves and records programs. It multicasts and records scheduled programs, unicasts on-demand programs, and transfers files according to the schedules defined in IP/TV Content Manager.

The IP/TV Server component is available as software only or comes installed on Cisco IP/TV 3400 Series Server hardware appliances (Archive Server and Broadcast Server).

The IP/TV Server component can function as an Archive Server for scheduled and on-demand programs, or it can be configured with a video capture card and function as a Broadcast Server, that is, with live encoding and serving functionality as well.

IP/TV Server also supports SmallCast for unicast transmission across nonmulticast-enabled routers (or across the Internet) and then multicasting to viewers on the remote network segment.

IP/TV Server runs on Windows 2000 and Windows NT 4.0.

Refer to the *Cisco IP/TV Administration and Configuration Guide* for information on how to install, configure, and administer IP/TV Server.

## How IP/TV Components Interact

You can use IP/TV for the broadcast of scheduled live or prerecorded programs, on-demand programs, or a combination of the two.

You can use a given server to broadcast both scheduled and on-demand programs.

[Figure 1-1](#) shows the interactions between IP/TV components in the case of scheduled programs. Note that although IP/TV Viewer receives program descriptions only from IP/TV Content Manager, the programs are sent to IP/TV Viewer from the various media servers. The media servers may be IP/TV Servers, MBone servers, or other servers that run IP/TV-compatible MBone tools.

**Figure 1-1 IP/TV Components—Scheduled Programs**

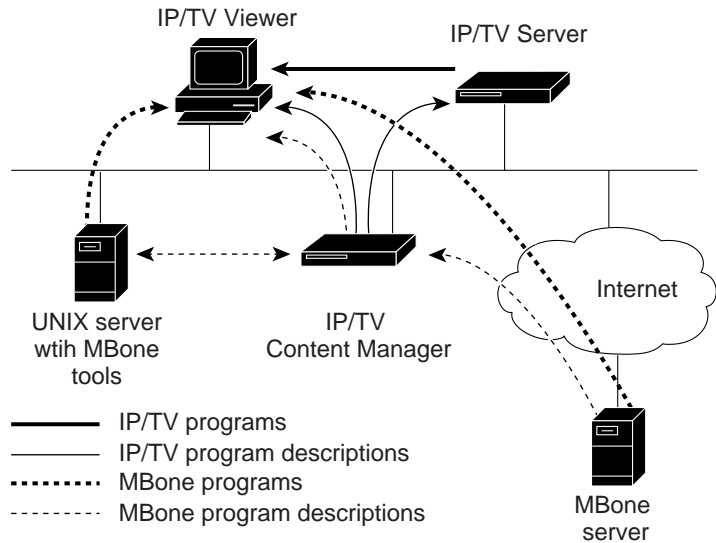
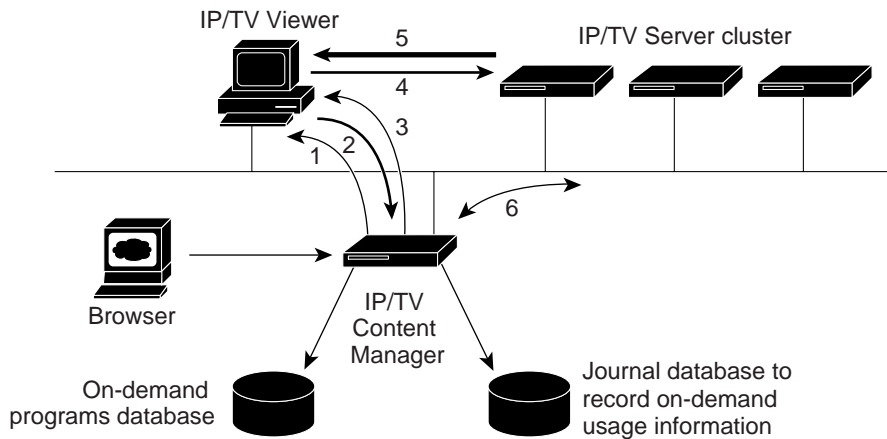


Figure 1-2 shows the interactions between these components in the case of on-demand programs. IP/TV Content Manager manages a group (cluster) of servers that together form a virtual machine, with an integrated database to keep track of program information. Clustering allows IP/TV Content Manager to balance the server load by routing a user program request to the least-busy server.

Figure 1-2 IP/TV Components—On-Demand Programs



1. IP/TV Viewer receives on-demand program descriptions
2. IP/TV Viewer makes on-demand request
3. Content Manager redirects IP/TV Viewer to least busy server
4. IP/TV Viewer makes on-demand program request of server
5. Server serves on-demand program to IP/TV Viewer
6. Server control and status

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## IP/TV Features and Functionality

IP/TV has the following turnkey, scalable features for delivering high-quality video over enterprise networks:

- **Codecs**—Support MPEG-2 for highest quality, MPEG-1 for TV-quality, and ISO MPEG-4 for high quality at lower bandwidths.

Industry standards for media streaming are used in compliance with Internet Streaming Media Alliance (ISMA) specifications to ensure interoperability.

- **IP multicast (with source-specific multicast [SSM])**—Facilitates delivery over multicast networks to minimize bandwidth for live and scheduled video. A single stream is broadcast over the network regardless of the audience size.

- **Quality of Service**—Enables QoS using Resource Reservation Protocol (RSVP) to ensure that bandwidth is allocated for video delivery.  
Audio and video streams are delivered independently to minimize the impact of network congestion on the client. Audio has priority.
- **IP/TV StreamWatch**—Allows quality and usage monitoring of clients during video delivery and generates logs for postevent analysis. IP/TV StreamWatch is scalable to large deployments.
- **Question Manager**—Allows clients to send text queries to a moderator during a broadcast delivery.
- **SmallCast**—Allows content delivery across one or more nonmulticast-enabled routers (or across the Internet) as a unicast transmission, and then is multicast to clients on the remote network segment.
- **Media synchronization tools**—Provides Web Presenter, ScreenCaster, and SlideCast integrated synchronization tools for the ability to deliver presentations (in the form of HTML pages, screen captures, or .jpg files) with video content.
- **Scheduling**—Allows setup of live or scheduled video delivery through a browser interface.
- **Program listing**—Automatically generates and updates the program listing at the client. The program listing is accessible from either a web browser or an IP/TV client.

## New Features in IP/TV Version 3.4

IP/TV Version 3.4 introduces the following new features:

- [ISO MPEG-4 Streaming and Recording](#)
- [MPEG-2 Transport Streaming and Recording](#)
- [Web Presenter Recording and Scalability Enhancements](#)
- [Incremental Installer for IP/TV Viewer](#)
- [McAfee and Host IDS Support](#)
- [IP/TV Content Manager Security](#)
- [StreamWatch Scalability Enhancements](#)

- [SmallCast Enhancements](#)
- [Updated Hardware and Software Components](#)

## ISO MPEG-4 Streaming and Recording

The ISO MPEG-4 simple profile codec takes advantage of improved compression technology that makes it possible to stream higher-quality video at lower bit rates.

The ISO MPEG-4 feature, which is supported through IP/TV software, together with the Winnov Videum 1000 Plus capture card (purchased separately), allows users to encode a live video stream using ISO MPEG-4 and an MP3 audio stream simultaneously.

A live ISO MPEG-4 program can be recorded to an MP4 media file on the origin server. The recorded MP4 file can be previewed locally on IP/TV Server using Microsoft Windows Media Player.

The MP4 file can be streamed in both scheduled and on-demand modes.

The Winnov Videum 1000 Plus capture card can be purchased separately from Cisco Systems. Minimum requirements for ISO MPEG-4 streaming and recording include a 1.6-GHz Pentium 4 processor, 512 MB of memory, and one free PCI slot for the capture card.

Because of performance limitations, the Cisco IP/TV 3424 Broadcast Server is not recommended for use with the ISO MPEG-4 codec.

## MPEG-2 Transport Streaming and Recording

MPEG-2 transport stream (MP2T) is used as a standard streaming format in the cable industry for streaming media to various endpoints, including (but not limited to) a set-top box (TV).

The MP2T feature allows you to record content locally and stream it as a single composite stream over Real-Time Protocol (RTP)/User Datagram Protocol (UDP). MP2T live capture is supported using the Optibase MovieMaker 200S video capture card, which comes preinstalled in both the Cisco IP/TV 3425 Broadcast Server and the Cisco IP/TV 3417 Starter Server.

The MPEG-2 transport format has been designed to be loss-resilient and can be used to stream high-quality PEG-2 content over lossy networks. Another advantage is its ability to multiplex different programs into a single stream, called a Multiprogram Transport Stream (MPTS).

## Web Presenter Recording and Scalability Enhancements

Web Presenter has been enhanced to allow recording to an MP4 media file and to support large-scale deployments.

### Recording

A live program containing audio, video, and a web presentation can be recorded to a local MP4 media file.

The web presentation portion of the live program can consist of the HTML content browsed in the Web Presenter application or of content captured from the screen using the ScreenCaster feature of Web Presenter.

The live encoded streams must be ISO MPEG-4 for video and MP3 for audio. In addition, both the video and audio server and the Web Presenter server must be the same.

### Scalability

To manage the number of receiver transmissions in large-scale Web Presenter deployments, several enhancements to the internal process have been made.

New mechanisms for appropriately suppressing requests for retransmission of missing packets and for limiting the number of times a missing packet can be requested have been implemented.

## Incremental Installer for IP/TV Viewer

The incremental installer feature allows users to upgrade IP/TV Viewer by updating only those files that have changed from the version already installed. Since the incremental installer image contains only upgrade files, the image size is smaller and easier to use.

This utility is run at the client and it automatically detects the IP/TV Viewer version installed. If the detected version is 3.2, then it will be automatically upgraded to Version 3.4.

The incremental installer feature is supported only when you upgrade from IP/TV Version 3.2.

## McAfee and Host IDS Support

IP/TV Viewer, IP/TV Content Manager, and IP/TV Server can now be run on the same system that has McAfee VirusScan and host Intrusion Detection System (IDS) installed (except when IP/TV Server is performing a live capture session or recording).

## IP/TV Content Manager Security

Username and password authentication has been added to IP/TV Content Manager to prevent unauthorized access to IP/TV configuration through a web browser. When accessing IP/TV Content Manager for the first time, a user is prompted for a password, which is set during installation. After the user has successfully logged in, subsequent access using the same browser session will not prompt for the password again.

## StreamWatch Scalability Enhancements

Two new enhancements have been made to IP/TV StreamWatch for better scalability and performance. In order to effectively analyze data received from thousands of clients, a filtering capability has been added to the StreamWatch graphical user interface (GUI). MySQL database has also been integrated with StreamWatch to support large amounts of log data.

## Filtering

A user interface filtering mechanism has been added to the StreamWatch application so that only the data of interest is presented to the administrator. Data feedback messages can now be filtered (in any combination) by:

- Quality of Service (QoS) (good, fair, poor, or unknown)
- Client subnet mask
- Maximum number of entries displayed

## Integration of MySQL Database

MySQL database has been integrated with IP/TV StreamWatch to provide better scalability. With this feature, administrators can easily monitor, log, and analyze huge amounts of data present in large-scale deployments.

## SmallCast Enhancements

IP/TV SmallCast enhancements include the ability to unicast audio and video streams to a maximum of 20 unicast destinations. Depending on what type of IP/TV Server is used, a maximum of 20 unicast streams can be delivered to nonmulticast-aware clients.

These enhancements also include support for a two-level SmallCast tree structure. In addition to multicasting incoming streams from the origin server, forwarding servers can also unicast outbound streams. This ability provides a feature resembling stream splitting, that is, unicast-in, multiple unicast-out.

## Updated Hardware and Software Components

Hardware and software updates include support for Microsoft Windows XP on IP/TV Viewer, support for the Winnov Videum 1000 Plus video capture card for ISO MPEG-4, and third-party server software upgrades.

## Support for Microsoft Windows XP on IP/TV Viewer

IP/TV Viewer can now be run under the Windows XP operating system. The following table summarizes the versions of Windows XP that are supported on each IP/TV component.

IP/TV Component	Windows XP Home Edition	Windows XP Professional Edition
Cisco IP/TV Viewer Version 3.4	Yes	Yes
Cisco IP/TV Server Version 3.4	Not tested	Not tested
Cisco IP/TV Content Manager Version 3.4	Not tested	Not tested

## Winnov Videum 1000 Plus Capture Card

IP/TV Version 3.4 supports ISO MPEG-4 using the Winnov Videum 1000 Plus capture card (in conjunction with IP/TV Server software) on third-party PC systems with a high-speed CPU. The Winnov Videum 1000 Plus capture card can be purchased separately from Cisco Systems.

Minimum requirements for ISO MPEG-4 streaming and recording include a 1.6-GHz Pentium 4 processor, 512 MB of memory, and one free PCI slot for the capture card.

Because of performance limitations, the Cisco IP/TV 3424 Broadcast Server is not recommended for use with the ISO MPEG-4 codec.

## Third-Party Server Software Upgrades

Upgrades to third-party server software include the following:

- Apache Web Server v1.3.24
- Sun Microsystems Java Runtime Environment (JRE) v1.1.8
- Windows 2000 Service Pack 2
- Windows NT Service Pack 6.0a

# About Scheduled and On-Demand Programs

IP/TV Content Manager can manage both scheduled and on-demand programs. A scheduled program consists of either live or prerecorded content that is multicast over the network at a set time. An on-demand program consists of prerecorded content that is unicast to a single client whenever it is requested.

The uses, advantages, and limitations of scheduled and on-demand programs are discussed in the sections that follow.

## Scheduled Programs

Scheduled programs are either live or prerecorded programs that are available to viewers at times defined by IP/TV Content Manager, and are delivered by one multicast data stream per media type (video, audio, Web Presenter, or SlideCast). Using multicast technology, scheduled programs can reach unlimited numbers of viewers simultaneously without overloading the network (refer to Chapter 1 of the *Cisco IP/TV Administration and Configuration Guide*).

Scheduled programs can be live content sent to viewers in real time, or prerecorded content that can be played repeatedly at scheduled times. Typical uses of scheduled programs include employee communications, group training, and distance learning.

## How Scheduled Programs Work

In IP/TV Content Manager, you define a list of scheduled programs and assign them to one or more specified servers. The list of programs is automatically sent to IP/TV Viewer, and the programs can be watched by users at the scheduled time.

## Programs and Channels

When you define scheduled programs, it is important to understand the relationship between programs and channels. In the IP/TV context, channels and programs are nearly identical to their network television equivalents, but there are a few differences. Understanding these differences will help you create the best model for your organization and manage IP/TV scheduled programming most effectively.

On network television, a channel carries either a single, continuous program (such as a 24-hour news channel) or a series of noncontinuous, back-to-back programs. Programs cannot exist without channels. All programs must be carried by a channel in order to be viewable. To view a program, the user tunes to its channel. The channel itself constitutes the address of all programs on that channel.

In IP/TV, a channel can carry either a single, continuous program, a series of noncontinuous, back-to-back programs, or both.

A noncontinuous program can overlap a continuous program. It is defined as a separate entity that can be tuned in by the user.

An example of a continuous program that has a noncontinuous program overlapping it is a 24-hour news service. The news program is always on, and users can tune in whenever they want to get a news update. Suppose, though, that the financial news is always discussed for one-half hour starting at 3:00 p.m., and some users want to subscribe only to the financial news so that IP/TV automatically launches the program for them. You can define a noncontinuous program that begins at 3:00 p.m. and runs for 30 minutes. The noncontinuous program is a subset of the 24-hour news program, and overlaps it for that 30-minute interval. This is a mechanism to allow the user to subscribe to a small portion of the continuous program.

A channel constitutes a template for programs. The programs on that channel share the channel address and a variety of common characteristics such as passwords.

Unlike network television, an IP/TV program need not be assigned to a channel. It can exist independently. In this case, the program simply has its own address. Thus, if you prefer, you can omit the channel mechanism altogether. However, a channel is useful if you want to create programs with similar characteristics.

**Note**

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Channels are invisible to users of IP/TV Viewer. To view a program, the user can either subscribe to the program explicitly, or select the program spontaneously. The resulting address belongs either to a channel or to an independent program. Either way, the actual address is invisible to the user.

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## On-Demand Programs

On-demand programs are available to individual users to watch at the time of their choosing. Because on-demand programs use unicast technology, multiple requests for an on-demand program require more network bandwidth than for a scheduled program (refer to the “Unicast Traffic” section in Chapter 1 of the *Cisco IP/TV Administration and Configuration Guide*). We recommend that you use the on-demand mode for programs that are accessed less frequently, such as individualized corporate training and video archives, and use scheduled mode for group viewing.

IP/TV Content Manager manages a cluster of servers that together form one larger server, with an integrated database to keep track of server and program information. IP/TV Content Manager automatically collects a list of available media files from the cluster and, using the Cisco FTP server, can also schedule distribution of files from one server to another or from an outside source to one or more of the servers.

The administrator then defines these files as programs in IP/TV Content Manager, using a hierarchical tree of program categories. A top-level category can contain subcategories, which you navigate to by clicking links. This hierarchical structure allows you to manage and make available a large library of programs. Unlike on-demand programs, scheduled programs do not have a tree structure, but their program listing on the client can be easily sorted by name, start time, end time, media type, or program description.

IP/TV Viewers receive on-demand programs only from their local cluster. One or more subnets can be defined as a proximity group, and one or more proximity groups are associated with a given server cluster. This allows the administrator to localize network traffic by ensuring that IP/TV Viewers receive on-demand programs only from their local cluster.

IP/TV Content Manager distributes a list of available on-demand programs to IP/TV Viewers, and this list is displayed on the program listing screen. When a user requests a program, IP/TV Content Manager uses information from the database to assign the least-busy server in the cluster to meet the request, and then directs IP/TV Viewer to that server. If one of the servers fails, or needs to be taken out of service, IP/TV Content Manager balances the request load among the remaining servers.

Channels do not apply to on-demand programs.

# Accessing IP/TV Content Manager

IP/TV Content Manager is accessed remotely using a browser. The computer used to access IP/TV Content Manager Version 3.4 must run Netscape Navigator 4.5x through 4.7x, or Microsoft Internet Explorer 5.x or later. The browser must have Java and JavaScript enabled. Check the browser Options or Preferences menu to be sure that these features are enabled.

**Note**

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For IP/TV Content Manager installation instructions, refer to Chapter 3 of the *Cisco IP/TV Administration and Configuration Guide*.

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To access IP/TV Content Manager, go to the following URL:

`http://contentmanagerhost/`

where *contentmanagerhost* is the DNS name or IP address of IP/TV Content Manager.

Enter the administrative username and password for the IP/TV Restricted Zone and then click **OK**.

**Note**

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The default username for the administrative account is set to **admin**, the default password is set to **cisco**. To change the default password, access the command line, change directory to C:\Program Files\Cisco Systems\IPTV Content Manager\Apache\bin. Enter the following command:

```
htpasswd -b passwd admin new_password
```

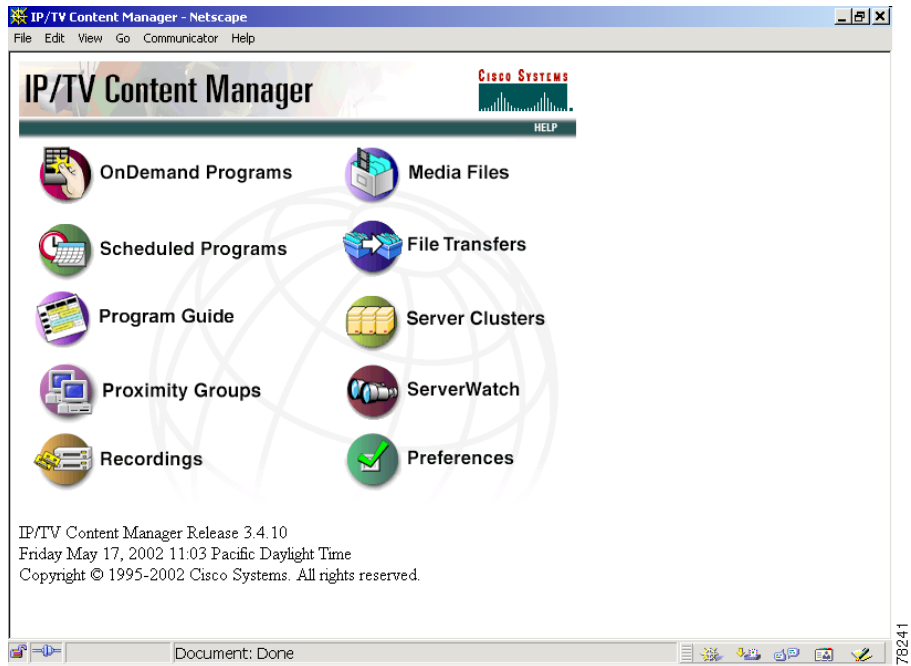
The change takes effect when you stop and restart Apache Service from the Control Panel.

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When you access IP/TV Content Manager for the first time, store the URL in the frequently visited sites list of your web browser. The actual mechanism you use varies depending on which browser you use. Refer to your browser documentation or help system for more information.

When you access IP/TV Content Manager, the first page that appears is the IP/TV Content Manager main page. (See [Figure 1-3](#).)

Figure 1-3 IP/TV Content Manager Main Page



The IP/TV Content Manager main page contains multiple links for setup and configuration, including on-demand and scheduled programs creation, proximity group and server cluster configuration, recordings and file transfer setup, and server status monitoring.

- The **OnDemand Programs** link takes you to the OnDemand Programs page, which displays information about existing on-demand programs and allows you to define new on-demand categories or programs. You can also search for an on-demand category or program by program name, category, keywords, or description. See Chapter 2, “[Managing On-Demand Programs](#),” for information.
- The **Scheduled Programs** link takes you to the Scheduled Programs page, which displays information about existing scheduled programs and allows you to define new scheduled programs. See Chapter 3, “[Managing Scheduled Programs](#),” for information.

- The **Program Guide** link takes you to the IP/TV Program Guide home page, which allows you to search for programs matching specific criteria. Refer to the *Cisco IP/TV Viewer User Guide* for more information.
- The **Proximity Groups** link takes you to the Proximity Groups page, which displays information about existing proximity groups, and allows you to define new proximity groups and subnets. A proximity group is a collection of subnets in which client viewers reside. Refer to the *Cisco IP/TV Administration and Configuration Guide* for information.
- The **Recordings** link takes you to the Recordings page, which displays information about existing recordings, and allows you to define new recordings. See the “[Recording Scheduled Programs](#)” section in Chapter 3 for information.
- The **Media Files** link takes you to Media Files page, on which you can view media files and edit their metadata. A link is provided to allow you to create new on-demand programs. See the “[Using Media Files](#)” section in Chapter 2 for information.
- The **File Transfers** link takes you to the File Transfers page, which displays information about existing scheduled file transfers among IP/TV Servers, and allows you to define new file transfers, display the results of a file transfer, and view or clear the file transfer log. Refer to the *Cisco IP/TV Administration and Configuration Guide* for information.
- The **Server Clusters** link takes you to the Server Clusters page, which displays a list of server clusters and allows you to define a new cluster or server. Refer to the *Cisco IP/TV Administration and Configuration Guide* for information.
- The **ServerWatch** link takes you to the ServerWatch page, where you can monitor the current status of servers. On the ServerWatch page you can also go to the ServerWatch applet window, where information about servers is dynamically updated. Refer to the *Cisco IP/TV Administration and Configuration Guide* for information.

- The **Preferences** link takes you to the Preferences page, where you can set IP/TV Content Manager options. In general, preferences should be changed only by the system administrator or network manager who installed IP/TV Content Manager. Refer to the *Cisco IP/TV Administration and Configuration Guide* for information.
- The **Help** link launches the IP/TV Content Manager online help utility. See the “[Using Online Help](#)” section in the preface of this guide for a description of online help.

