QuickTime Streaming

Mac OS X Server

End-to-end solutions for live broadcasting and on-demand streaming of digital media.

Features

Unlimited cross-platform streaming
- Streams to any standards-based media player on any platform
- Relays streams to additional servers for broadcasting to a virtually unlimited number of viewers

Standards-based streaming
- Delivers streams over RTP/RTSP via multicast or unicast transport
- Supports native MPEG-4 streaming
- Serves MP3 files via Icecast-compatible protocols over HTTP to any MP3 client

Flexible delivery methods
- Live broadcasting using QuickTime Broadcaster
- Simulated live broadcasts of prerecorded content
- On-demand streaming
- Fast Start delivery over HTTP

Comprehensive, easy-to-use tools
- QuickTime Streaming Server Publisher for creating playlists and managing server-side media content
- Local, remote, or web-based administration options
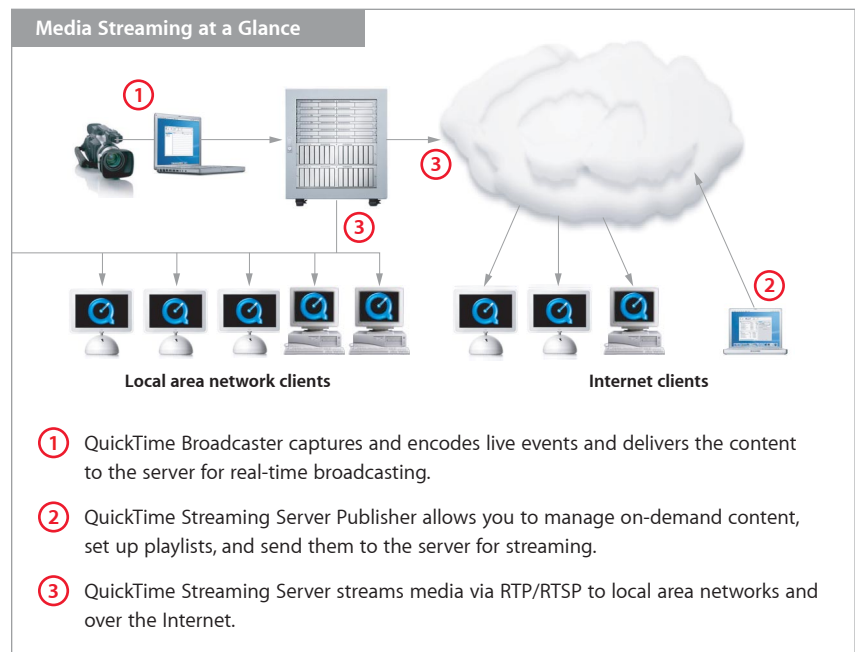- Logs and performance statistics for real-time monitoring and planning

Superior quality of service
- Instant-On to reduce waiting time for broadband users
- Skip Protection for high-quality media streams

Mac OS X Server v10.3 includes the latest version of the popular QuickTime Streaming Server, providing a complete solution for streaming live and on-demand media to audiences everywhere. Whether you're broadcasting employee communications, implementing a distance learning program, or simply creating more engaging content for your website, Mac OS X Server makes it easy and affordable to enhance and extend the reach of your communications with rich video and audio content.

QuickTime leads the industry as the most versatile, cost-effective platform for creating, playing, and streaming digital media over the Internet. It supports all the latest digital media standards, including MPEG-4 and 3GPP, so your content can be played anywhere, using any standards-compliant media player.

Reliability, scalability, and the latest in standards-based technology make QuickTime Streaming Server the most flexible media streaming solution available. It's also the easiest to deploy and manage, thanks to the innovative administration and publishing tools built into Mac OS X Server.

Media Streaming at a Glance

Local area network clients   Internet clients

① QuickTime Broadcaster captures and encodes live events and delivers the content to the server for real-time broadcasting.

② QuickTime Streaming Server Publisher allows you to manage on-demand content, set up playlists, and send them to the server for streaming.

③ QuickTime Streaming Server streams media via RTP/RTSP to local area networks and over the Internet.

What Is Streaming?

Two methods are commonly used for delivering audio and video content over the Internet: Fast Start (also called progressive download) and real-time streaming. Right out of the box, Mac OS X Server includes the tools you'll need for deploying either service. To choose the technology most appropriate for your needs, it's helpful to understand how each one works.

Fast Start allows users to watch or listen to media as it is being downloaded from a standard web server (such as Apache, which is built into Mac OS X Server) to their hard drive. This method works best for short-form media where file size is limited. Fast Start ensures high-quality playback regardless of users' Internet connection speed, although users with slower connections will wait longer before media starts to play.

Real-time streaming using QuickTime Streaming Server delivers media in real time over the Internet, from modem to broadband rates. With the open standard Real-Time Transport Protocol/Real-Time Streaming Protocol (RTP/RTSP), no file is ever downloaded to a viewer's hard drive. Media is played, but not stored, by the client software as it is delivered. Real-time streaming is often preferable to progressive download for webcasts of live events, delivery of long-form video, and 24/7 Internet radio and TV channels.

Flexible Media Streaming Options

QuickTime Streaming Server provides three mechanisms for real-time media streaming: live, simulated live, and on demand.

Live
Live events, such as concerts, speeches, news, or sports coverage, can be streamed over the Internet with the help of broadcast software, such as QuickTime Broadcaster. QuickTime Broadcaster encodes the live source—from a microphone, video camera, or other recording device—in real time and delivers the resulting stream to the server. The server then serves, or "reflects," the stream so the audience experiences the event as it happens.

Simulated live
Internet radio and TV producers, distance learning teachers, and corporate trainers can simulate live broadcasts by creating playlists of music, lectures, interviews, and other prerecorded media. As with live broadcasts, all users connecting to the stream see the same point in the simulated live broadcast at the same time. Since the event is not live, broadcasting software is not required.

On demand
To provide "anytime" access to feature films, lectures, presentations, and other content, you can use on-demand streaming. In this scenario, each user initiates the stream independently, so everyone experiences the audio or video content from the beginning. Like live and simulated live broadcasts, on-demand streams are played, but not stored, by the client software. This means that no files are downloaded to the viewer's hard drive, allowing you to maintain control over the distribution of your media.

Fast Start delivery
Using the Fast Start technology in QuickTime, media begins playing as soon as enough content has been downloaded. That means users can start watching or listening right away, while the media file continues to download in the background.

Enjoying streamed media
Your Mac and Windows audiences can experience streaming media using:
· QuickTime Player to "tune in" to a live or prerecorded broadcast.
· A web browser with the QuickTime plug-in to play streamed media from a web page.
· Software such as iTunes, SoundJam, or MUSICMATCH to listen to Internet radio and MP3 or AAC playlists.
· MPEG-4–compliant players, including mobile devices, to view MPEG-4 files anywhere.

Xserve and Xserve RAID
The combination of Apple's Xserve and
QuickTime Streaming Server technologies
provides a massively scalable architecture
for live and on-demand streaming. Xserve
RAID adds high-availability, affordable
capacity for storing terabytes of digital
content.

Multicast and Unicast Streaming

QuickTime Streaming Server supports both multicast and unicast network transports
to deliver streaming media, giving you the flexibility to choose what's right for your
audience and what works best on your network.

In a multicast, each client tunes in to the same stream, much as a radio tunes in to
an FM broadcast. The single multicast stream is sent to a group address, which can
be accessed by many client computers simultaneously. This minimizes network conges-
tion because it uses a fixed amount of bandwidth, regardless of the number of client
connections. However, multicast delivery requires special network capabilities: The
network must be multicast enabled for content distributed within a contained private
network; or it must have access to the multicast backbone, or Mbone, for content
generally distributed over the Internet.
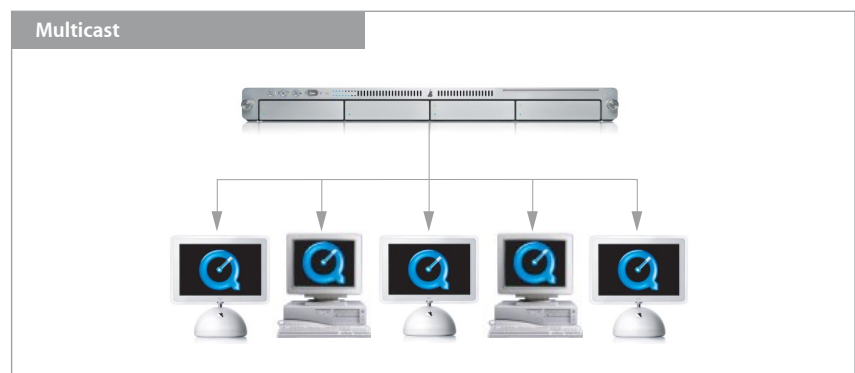
In a unicast, each client initiates its own stream, generating many one-to-one con-
nections between client and server. Although this can result in heavy network traffic,
unicast is the most reliable technique for delivery over the Internet, since no special
network transport is required.
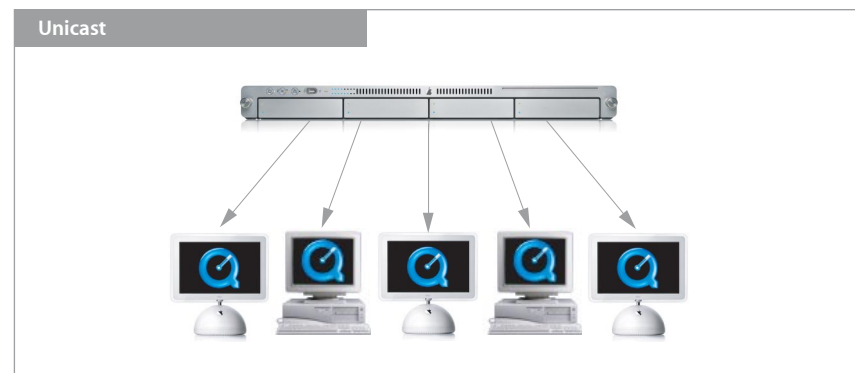
Relaying streams for extended reach
Whether you use multicast or unicast, it's easy to extend the reach of your media server
by relaying streams. When relaying is turned on, the streaming server automatically
forwards the stream to one or more additional servers, enabling the streaming load to
be shared by those servers. Especially important for live and simulated live scenarios,
relays can reduce network congestion and are useful for broadcasts with large num-
bers of viewers in different locations.
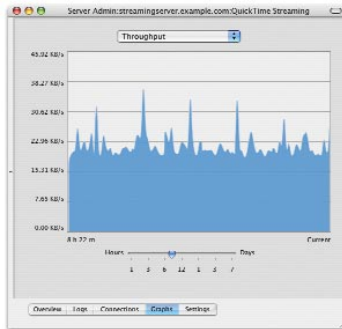
Remote management
Use Server Admin to remotely configure and manage streaming services, view real-time activity logs, and monitor server throughput and traffic.
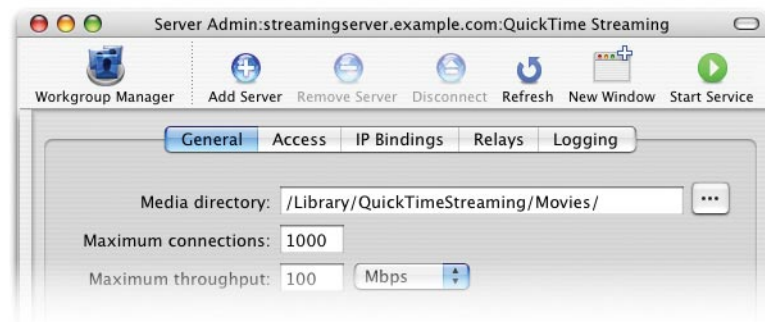
QuickTime Pro
Apple's QuickTime Pro application delivers powerful media authoring capabilities, including complex video and audio encoding, hinting media files for streaming, Media Skin creation, automation of repetitive production tasks, and assembly of different media types into a single movie file.

Setting Up QuickTime Streaming Server

Setting up and administering QuickTime Streaming Server is a snap with the easy-to-use Server Admin application in Mac OS X Server. Server Admin can run on any Mac OS X Panther system, providing secure remote management and monitoring of your server from anywhere on the Internet. The full suite of Server Admin capabilities can also be accessed from the terminal using SSH—ideal for UNIX-savvy administrators who prefer a scriptable, command-line environment.

After logging in to Server Admin, simply click the Start Service button and the content in your Media folder is made available for streaming over the Internet. You can also use Server Admin to set access privileges and passwords, create relays, and customize log settings. You can even bind QuickTime Streaming Server to a specific IP address if you are hosting websites on the same server.

Preparing Content for Streaming

For simulated live and on-demand streaming, your media must be compressed, hinted, and uploaded to the streaming server. The new QuickTime Streaming Server (QTSS) Publisher application simplifies these tasks, as well as helping you to post media to your website.

Compressing media files
Uncompressed video files require massive bandwidth, making it impossible to send them over the Internet. That's why it's necessary to compress, or encode, your movie before streaming. Start by choosing an audio or video compressor optimized for streaming and select a data rate appropriate for the connection speed of your target audience. Because QuickTime 6 has full support for MPEG-4, the industry standard for delivering digital media over the Internet, you can use QuickTime Pro or any application that uses QuickTime (such as Final Cut Pro, Discreet Cleaner, Final Cut Express, or iMovie) to create MPEG-4 files for streaming with QuickTime Streaming Server.

Hinting media files
Movies intended for streaming must be "hinted"—that is, they need a hint track for every streamable media track. A hint track contains information that tells QuickTime Streaming Server how and when to deliver each frame of media when the media player requests the stream. You can apply hint tracks in the application you use to encode your video. Or for added convenience, QTSS Publisher automatically applies hint tracks to any movies that have not yet been hinted.

Uploading media content

QTSS Publisher runs on any Mac OS X Panther system. This makes it easy for any authorized user or administrator, anywhere on the Internet, to securely log in and upload content directly to the streaming server.

Managing your media

The intuitive QTSS Publisher interface makes it easy to upload prerecorded media to the streaming server and manage media playlists. Creating playlists of MP3 audio, AAC audio, MPEG-4 video, and QuickTime movie (.mov) files enables you to turn your server into an Internet radio station or give your audience a simulated live video experience. Playlists can be set to play back in order or randomly. You can even add media to a playlist on the fly, without having to interrupt the stream.
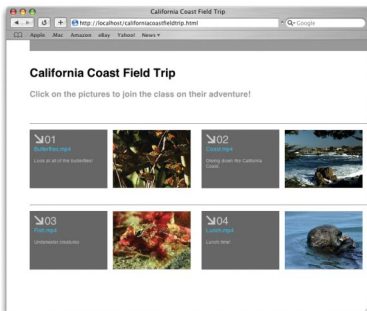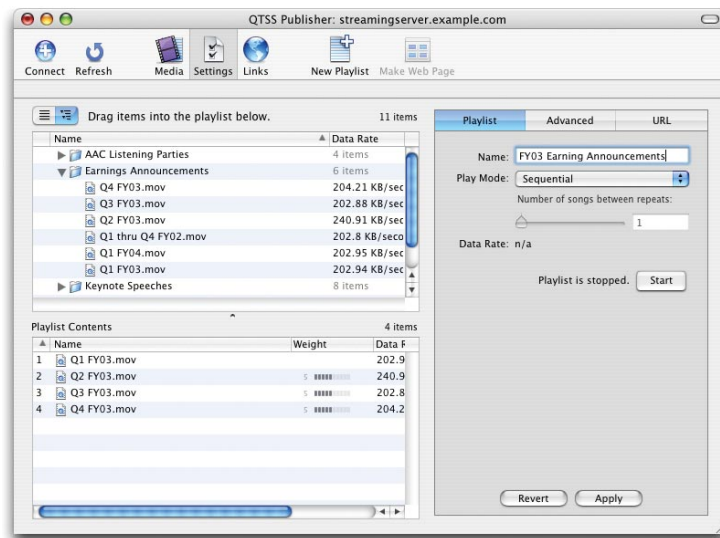
Web publishing templates

QTSS Publisher includes web page templates, making it easy to publish your media playlists.

Posting media to a web page

QTSS Publisher allows you to create streaming media web pages in just a few clicks, making your digital media content available to any Mac or Windows web browser via the QuickTime plug-in. Choose the Make Web Page button and select one of the included templates; QTSS Publisher generates a professional-quality web page. Since the templates are based on the Extensible Style Sheet Language Transformation (XSLT) open standard, you can customize them to fit your needs or even create your own. QTSS Publisher also generates the HTML code necessary for embedding QuickTime content in your own web page, allowing you to create custom web pages by copying the code into your favorite HTML editor.
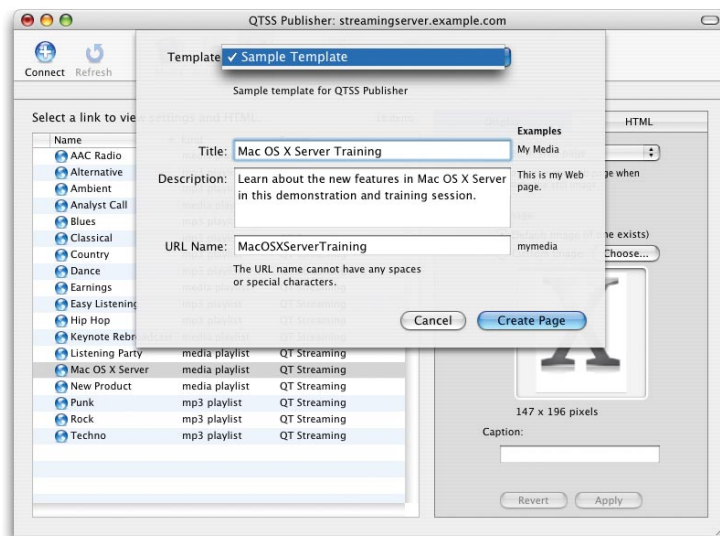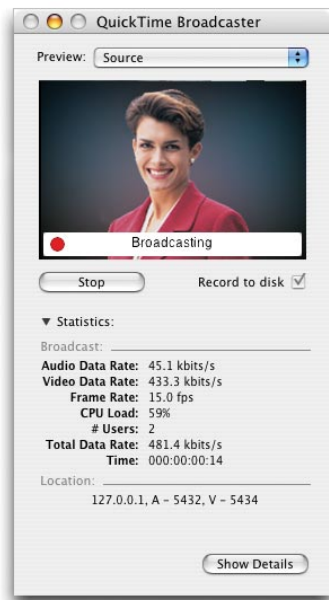
QuickTime Broadcaster
Included with Mac OS X Server, QuickTime Broadcaster is also available as a free download from the Apple website.

Broadcasting Live Events

Apple's QuickTime technologies combine to provide an end-to-end solution for producing professional-quality live events for online delivery—quickly, easily, and affordably. Included with Mac OS X Server, QuickTime Broadcaster live encoding software has broad, extensible codec support and works seamlessly with QuickTime Streaming Server, making it easy to reach large numbers of viewers for corporate meetings, online courses, keynote addresses, entertainment, and other special events.

Live streaming begins with a Mac desktop or notebook computer connected to a video camera, microphone, or other media-recording device. Using QuickTime Broadcaster, the system digitizes and compresses the media feed and sends the encoded signal to the server. The QuickTime Streaming Server software then reflects the signal, sending it out to audiences, who "tune in" with QuickTime Player.

While it's possible to broadcast and stream from the same system, when streaming to larger audiences you'll want separate systems. This improves performance, enabling you to dedicate one computer to compressing the live source content and another to serving the broadcast over your network or the Internet. Having separate systems also gives you more flexibility: For example, you can broadcast from a notebook computer onsite to a server in a remote location.

Using QuickTime Broadcaster
QuickTime Broadcaster has presets for popular broadcasting configurations, so you can produce a live event in just a few clicks. For media professionals who want more encoding control, a full array of advanced settings provides options for custom configurations. To help you manage your broadcast, QuickTime Broadcaster displays real-time statistics, including the data rate of the audio and video stream, the video frame rate, the processor load, the number of connected users, and the data rate of the broadcast.

Instant video-on-demand
While you're recording and streaming your live broadcast, you can also save the content for viewing after the event is over. In addition to saving the encoded file to your hard drive, QuickTime Broadcaster hints the file for posting to the streaming server—perfect for on-demand access or a simulated live broadcast immediately following the event.

Apple Server Solutions

Media streaming services are among the powerful workgroup and Internet tools built into Apple's UNIX-based Mac OS X Server operating system. Combining the latest open source technologies with Macintosh ease of use, Mac OS X Server unleashes the power of Xserve, Apple's rack-optimized server hardware. With phenomenal performance, massive storage capacity, high-bandwidth I/O, and integrated remote management tools, Xserve running Mac OS X Server is an unparalleled server solution for businesses, schools, and research centers.

For More Information

For more information about Mac OS X Server, Xserve, and other Apple server solutions, visit www.apple.com/server. For more information about Apple's suite of QuickTime technologies, see www.apple.com/quicktime.