QuickTime™ Conferencing SDK

QTC—Questions & Answers

Does QuickTime Conferencing require specific networks, digitizers or compressors ?

QuickTime Conferencing is transport independent, compression independent and media device independent. QuickTime Conferencing is architected to run on a variety of networks (ISDN, Ethernet, IsoEthernet, ATM, FireWire), network protocols (AppleTalk, TCP / IP, RTP), use QuickTime compliant sound or video compressors (Apple Video, JPEG, MPEG, H.261, Indeo) and work with media input devices (built-in or third party video / sound digitizers). The QuickTime Conferencing architectural view is that the user and third party developer should not have to know about lower level distinctions of Compressors, devices and networks. This is so that they can focus on what is really important—the user.

How does QuickTime Conferencing work with other Apple technologies ?

QuickTime Conferencing builds upon the latest version of QuickTime for multimedia capture / playback support, PowerTalk for network browsing and directory services, and the existing and future Apple communications APIs for networking. At a hardware level, QuickTime Conferencing takes advantage of the AV capabilities of AV Macintoshes. QuickTime Conferencing will operate on any Macintosh equipped with a 68040 or PowerPC processor. Finally, the high performance of PowerPC chips is key to enabling a new generation of low-cost, software-based video teleconferencing and multicast systems. QuickTime Conferencing exploits the tight system software and hardware integration possible with Macintosh

What is Apple doing for multicast network technology ?

Apple has developed a multicast network protocol for QuickTime Conferencing, which can run on small networks or on large enterprise-wide networks. This protocol is called AppleTalk Multicast. Apple will discuss this protocol in open forums, such as the AppleTalk Network Forum, and for interested vendors, such as third party router and intelligent hub manufacturers. QuickTime Conferencing will also be able to support other multicast protocols, such as IP multicast (used on the Internet) through QuickTime Conferencing support for OpenTransport. The AppleTalk Multicast protocol can support end-user applications such as remote learning, classroom media sharing and distribution of corporate or academic speeches on a campus network.

Is Apple shipping an end user applications for QuickTime Conferencing ?

Apple is developing an end-user application for QuickTime Conferencing to test out the APIs, to provide a human interface example for multimedia networking, and provide basic end-user functionality.

Does QuickTime Conferencing support multi-party conferencing ?

A key aspect of the QuickTime Conferencing architecture is its ability to support conferencing among multiple users. The QuickTime Conferencing framework supports multi-party conferencing, multi-party conversation recording and multi-party white

boarding functions. A typical Power Macintosh can easily support three or four AV conferencing users, and a high-end Power Macintosh can support even more on a single desktop.

How does QuickTime Conferencing impact traffic on existing networks ?

If QuickTime Conferencing is running on a shared, asynchronous network such as Ethernet, then QuickTime Conferencing will have an impact on the network. If QuickTime Conferencing is running on an isochronous network (such as ISDN or IsoEthernet) then the impact is limited to the specific dedicated link in use. When QuickTime Conferencing is in use on a shared network, special care has been taken to minimize network impact for other users on the network who are not engaged in conferencing or real-time media usage.

QuickTime Conferencing has been developed using patent-pending flow control algorithms, so that multimedia data rates will be adjusted based on network load, CPU performance differences and local processing overhead. If a network is highly congested, then QuickTime Conferencing will reduce its transmission rates. If many users are sharing a network for conferencing, along with e-mail, server access and printing, then QuickTime Conferencing will adjust the rates of all of the conferencing users accordingly, so that there is a low or zero packet loss rate. QuickTime Conferencing has been tested in a heavy traffic campus environment, with normal usage taking place and media conferences going through numerous routers and hubs with high performance.

What bandwidth does QuickTime Conferencing use on the network ?

For audio only, typically on the order of 64 kbits / sec to 176 kbits / sec. With full-duplex audio and video , the data rate can range from 96 kbits / sec up to roughly 1 Mbit / sec or more. The data rate is directly related to the software or hardware audio / video compressor which is selected by the user.

Does QuickTime Conferencing set standards for collaborative data sharing?

QuickTime Conferencing 1.0 is focused on APIs and system level services for supporting real-time media on a variety of transports. Standards for shared application, shared white boards and real-time collaborative data sharing are considered important future areas for development, building on top of the foundation created by QuickTime Conferencing 1.0.

Does QuickTime Conferencing support H.320?

H.320 is an international standard for video conferencing. This protocol was developed by the CCITT (now the ITU), a worldwide standards organization. The H.320 standard defines audio and video coding formats and the multiplexing of the audio, video and data onto communications links for real-time AV telephony and data transfer. QuickTime Conferencing was designed specifically to allow the support of different AV compressors, network transports and network protocols. Hence, support for standards such as H.320 are considered as a key element of the QuickTime Conferencing design goals.

Using the QuickTime Conferencing architecture, QuickTime Conferencing components can be developed which implement the different protocol elements of the H.320 standard. For example, it is possible to create H.320 specific versions of the transport and network components. Apple is working together with third parties to ensure that H.320 compliant solutions will be available which are QuickTime Conferencing compatible. For QuickTime Conferencing version 1.0, H.320 support will not be included directly from Apple, but will be available as additional hardware and software elements from third-party developers.

H.320 support will allow QuickTime Conferencing users to call into a diverse set of H.320 systems on the Macintosh and other platforms, such as the PC, as well as videoconferencing room systems (from a number of different vendors) worldwide.

Does QuickTime Conferencing support H.261?

The first release of QuickTime Conferencing will support the international compression standard for video conferencing, the H.261 video coding algorithm. H.261 is also referred to as the p*64 algorithm, since it is capable of generating video bit rates from 64 kbit/sec (where p = 1) up to 1.5 Mbit/sec (where p = 24). H.261 is designed to run at a variety of bit rates, from 64 kbit/sec up to 1.5 Mbit/sec, in increments of 64 kbit/sec. The initial Apple implementation will run at CIF resolution (352 x 288) or at QCIF resolution (176 x 144) at 10-15 fps on a PowerPC 601 processor, and will operate within the bit rate regime of 32 kbits/sec. to 384 kbits/sec. Because of the high performance of the PowerPC 601 and 604 processors, software based encoding and decoding of H.261 is now practical for the first time. Using H.261 within the QuickTime Conferencing environment will produce acceptable performance on ISDN, the worldwide TCP/IP Internet and enterprise networks for many conferencing users. The inclusion of a H.261 software video compressor is a key advantage of a QuickTime Conferencing based solution, as most systems have typically required expensive hardware to provide this capability. Instead, Apple is providing a low-cost, software-only, standards-based solution. This approach will also promote interoperability with other systems for teleconferencing.

What is the cross platform strategy for QuickTime Conferencing ?

QuickTime Conferencing was designed specifically to allow the support of different audio and video compressors, network transports and network protocols. The architectural approach taken with QuickTime Conferencing will more easily facilitate the support of interoperating with proprietary and standards based systems on other computing and communications platforms. Apple is working together with third parties to build interoperable QuickTime Conferencing components which can communicate with systems in the PC/Windows environment. The QuickTime Conferencing philosophy is that there will be a variety of standards which will evolve over time. The best approach is to have a flexible architecture which can easily accommodate the ability to communicate with these different standards.

Usage of the interoperability components within the QuickTime Conferencing framework will make communications with PC based standards “transparent” to the end-user and developer.

What provisions for network bandwidth management does QuickTime Conferencing provide?

QuickTime Conferencing has five features to assist in the area of providing efficient and manageable network bandwidth for real-time media streams. These features are:

Flow Control for Real-Time Media. QuickTime Conferencing provides flow control algorithms which control network bandwidth when using real-time media streams, and scale the bandwidth of the media streams down as the network traffic increases (or as more users are active on the network). The scaling , or graceful degradation techniques, will maintain audio quality while concurrently reducing video quality, since people are more sensitive to continuous audio quality.

Multicast Media Streams Distribution. QuickTime Conferencing provides multicast capability for efficient distribution of media streams on enterprise networks. Multicast distribution of media means that data only goes to those machines which request the data, not all machines on the network. This provides an efficient means to provide media broadcast services, along with multi-party conferencing.

Priority and Custom Queuing at the Router Interface. Commercial routers for enterprise networks can often support the notion of traffic prioritization and / or traffic segmentation. Traffic prioritization at the router results in real-time media traffic being given a higher (or lower) priority than other types of data traffic flowing through the router; traffic segmentation allows a network administrator to determine how much data of a particular traffic type can flow through a router. These mechanisms allow the control of data through routers in a manageable fashion.

Low Bit Rate Video Coding Algorithms Apple is providing a baseline software implementation of the worldwide video coding standard H.261. The H.261 algorithm can generate video at bit rates as low as 32 to 64 kbits / sec. The full scaling of the bandwidth for H.261 is 64 to 384 kbits / sec., which is relatively low compared to other coding schemes such as motion-JPEG, Apple Video, Indeo and Cinepak. The low bit rate of the H.261 coding algorithm will result in a far lower impact on the network overall, and on other network users (who may not use real-time media services). In addition, Apple is working with third parties to provide alternative low bit rate video coding algorithms for evaluation purposes.

How will QuickTime Conferencing affect my existing local area network installation

QuickTime Conferencing has several safeguards in order to reduce the impact of real-time sound and video media streams over existing networks.

The first safeguard is QuickTime Conferencing's ability to compress sound and video with any compressor supported by QuickTime. The required bandwidth for media data will vary due to different compression algorithm, video window sizes, sound sample rates, etc. If you are concerned about network bandwidth, we recommend the use of H.261 video compression, and MACE 6:1 sound compression algorithms.

The second safeguard uses the QuickTime Conferencing Flow Control component to monitor the performance of the computer and network. Base on this monitoring, the video frame rate is adjusted by QTC to reduce the overloading of the computer and network.

The third and final safeguard is utilizes Simple Network Management Protocol (SNMP). An additional QuickTime Conferencing component has been developed that allows a network administrator to monitor the current bandwidth being used by QTC applications; monitor the number of active QTC applications; and monitor the number of active QTC connections. Additionally, the network administrator can set the maximum allowed bandwidth of a node via SNMP. If SNMP is not used by the network administrator, the QTC system extension will use a default maximum allowed bandwidth to limit the impact on the network.

Does QuickTime Conferencing work with OpenTransport ?

QuickTime Conferencing is designed to be transport independent. It has been crafted so that it is both "future ready" and backwards compatible with regards to transport independence. QuickTime Conferencing is "future ready" by virtue of its network interface, which has been specifically designed for OpenTransport. The OpenTransport component will enable any network provider who develops with OpenTransport to use QuickTime Conferencing. QuickTime Conferencing is backwards compatible by allowing users to run with existing network software such as AppleTalk, MacTCP, and Communications Toolbox. The network interface will also support platforms that do not have OpenTransport. QuickTime Conferencing has the same message as OpenTransport—transport independence is a fundamental element for networking software in the 1990's.

How does QuickTime Conferencing work with OpenTransport ?

QuickTime Conferencing provides a set of higher layer abstractions and system services which reside above the transport layer. The QuickTime Conferencing API provides services such as multiplexing and demultiplexing of media streams, media based flow control, stream format negotiation, packetization and reassembly of media data and other real-time media stream services. These services are provided to make it easy for developers to incorporate real-time networked media into a broad variety of software applications. Any network provider who builds OpenTransport modules will enable users and developers to access their network services via QuickTime Conferencing at the higher system service layers.

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Credits

Document by Eric Hoffert, Ramiro Calvo and Dean Blackketter.

Important Note

The content of this document is of a preliminary nature, and is subject to change without notice.