

Streaming Media

What is Streaming Media?

Streaming media is data that is delivered in a continuous stream to a client and that can be used as it arrives. Examples of the use of streaming media are to deliver music and video to clients. This contrasts with "batch" media or data that must be delivered in its entirety before it can be used. Examples of batch media are PowerPoint and Word files, and program executables that must be downloaded in their entirety before they can be used.

The use of streaming media means that there is not much delay before a streaming application can start using the data, for example, to play music or to show a movie.

Streaming applications have been constrained by technology, but this is changing. The number and variety of streaming applications will increase rapidly in the coming years with

- o the increase in broadband connections,
- o decreasing cost of bandwidth,
- o decreasing cost of internet enabled devices,
- o increasing number internet enabled devices, and
- o better video compression technology

Streaming media servers deliver audio and video in real-time to Internet-enabled devices such as PCs and PDAs.

Streaming media appliances are streaming media servers embedded in a box with a plug-and-play (box). Such boxes are focused on delivering stream media as opposed to general-purpose servers that contain software optimized and focused on stream, and their hardware design is optimized for factors such as using minimal rack space.

Streaming Content versus Static Content on the Web

Compared to static content like web pages, streamed content, such as video clips and movies,

- o is much bigger in size,
- o uses much more bandwidth,
- o takes longer to transmit, and
- o has real-time demands.

What are the Challenges in Streaming Media?

For a high quality viewing experience, packets of the streamed content must be delivered at a steady rate over the entire viewing session. Currently, the public Internet does not support different qualities of service (QoS) by allowing packets with real-time needs to be assigned a higher priority. For example, packets representing a voice stream should be given a higher priority than packets that are part of a file transfer or a web page download. Consequently, the delivery of streaming media over the public Internet is fraught with problems such as delays and loss of packets.

Streaming media technology aims to improve the delivery of streaming media shared IP networks such as the public Internet. Congestion in the network causes hiccups (jitter) in the delivery that is characterized by

- o loss of packets (you lose some content)
- o a real-time viewing is interrupted by pauses resulting from the viewer (client) software being forced to wait for the data packets to arrive.

Congestion occurs when the number of packets being transmitted exceeds the network bandwidth capacity (the capacity of the pipes and routers).

Some streaming media servers use a lower encoding (lower picture quality that sacrifices motion or clarity by using fewer bits in its representation) stream when the network is congested. A higher encoding is used when the network congestion goes away.

What Happens in Streaming Media Delivery?

Streaming media delivery involves the following steps:

- o Capture of the media (data).
- o Encoding (compression) of the data into a format required by the streaming media server.
- o Delivery of the streaming media (e.g., upon client request) using the streaming media server.
- o Playing of the media at the client.

Major Streaming Formats

There are three major players in the streaming and each one has its own major formats that have been established by the three major players in the streaming:

- o RealNetworks (RealMedia format).
- o Microsoft (Windows Media format).
- o Apple (QuickTime format).

These are the de facto industry standards.

Where will Streaming Media be Used?

Stream media applications in both the Business-to-Consumer (b2C) and Business-to-Business (B2B) spaces:

- o B2C applications (sports, distance learning, briefings, on demand movies).
- o B2B (corporate announcements, training).

Some Issues with Streaming Media Applications

- o Is it easy to load, manage, and remove files holding the streaming media?
- o What are the formats supported (e.g., RealMedia, Windows Media, Apple QuickTime)?
- o How many simultaneous streams that can be supported?
- o How many simultaneous media that can be served.
- o What is the amount of content that can be delivered (total megabits)?
- o Which of live feeds or on-demand feeds is supported?
- o How much rack space is required?
- o Does the streaming server use a lower encoding rate (lower quality) stream to address a congested network?
- o Does the streaming server work with mirrored and cached networks (i.e., works with replication and cache servers)?
- o Is the server scalable?
- o Does the streaming media server work with the standard players or does it require a proprietary viewer?
- o Does the streaming media server support multicasting?

Where Can I Find More Information?

There are many players in the streaming media market. But the three major ones, the ones controlling the de facto standard formats are:

- o [RealNetworks](http://www.realnetworks.com/solutions/media/index.html) (<http://www.realnetworks.com/solutions/media/index.html>)
- o [Microsoft](http://www.microsoft.com/windows/windowsmedia) (<http://www.microsoft.com/windows/windowsmedia>)
- o [Apple Computer](http://www.apple.com/quicktime) (<http://www.apple.com/quicktime>).