



How to...Stream Live Events

Production of the streaming live audio and audio-visual events is more and more popular form of the multimedia activity using possibilities of the broadband networks. It requires both preparation of the organizational backups and solid hardware-technological support. Character of the event, a potential number of receivers, single or serial mode of the transmission, range of the preparation work (only digitization and distribution ready signal on the Internet or comprehensive audio-visual service) also makes considerably more possible issues to solve than it seems from the user perspective.

Criteria Of The Technology Choice

The crucial task to solve in the network multimedia transmitting is the optimal choice of the distribution platform technology. From among several available solutions on the market the choice barrier may be both the server platform (attainability of streaming server software for own and used platform as well as their scalability and price), guidelines of the transmission (the payment model applied by the software producers licensing global transmission capacity, single streams, number of simultaneous streams or free of limits) or licensing possibilities of use (limits for educational software packs as for non-commercial content in distributed streams). The considerable matter is also availability and generality of the solution in the target group of receivers, requirements and potential problems in the installation of additional software - players and codecs (software decompression plug-ins of multimedia format) for used applications. It is also technical requirements of client computer not only in depiction of hardware resources as processor, memory or adequate graphics card, but in the network configuration - necessary capacity and possibilities of stream receiving according to the used security politics - limits on routers, firewalls, proxy devices and personal software firewalls).

The most popular solutions currently used are: *Windows Media* (audio & video), *Real Media* (audio & video), *Flash Media* (audio & video), *Darwin QuickTime* (audio & video) and Open Source solutions based on *IceCast* technology (*Ogg Vorbis* for audio & *Ogg Theora* for video) and *ShoutCast* (audio & video).

The best solution is obviously an compromise of the all above assumptions; low cost of the installation, efficiency, using of currently owned hardware infrastructure, transparency and user service friendliness as well.

The Distribution System

Decisive factor of the venture success is starting the streaming distribution system in the working order. Even as in the very wide available output network capacity, the bottleneck of the whole installation could be also a power of the stream serving computer. To get more reliability and possible biggest availability of the transmission it has to avoid the simplest and at the same time the



more restricted configuration of "one to many" type with one streaming server. Most of the software platforms allows to build the distributed systems, replicating streams and dividing transmission load according to geo-localization or actual demand for resources, and in the case of failure of one element - allowing dynamically take the part of tasks. Certainly, from the other side, too much complicated and complex hierarchical system might cause growth of the transmission delay, unfavorably affecting the reception of the live events transmission.

Optimal Parameters Selection

An important issue here is also right tuning of the transmission parameters. Correct estimation of the potential group of receivers not only engages the infrastructure loading tests and experimental research of the similar events, but also the preparation of suitable bigger "*security buffers*". Sure enough, the number of the users is often impossible or very hard to expect, and character of the transmission oriented on the time-sensitive event can cause sudden growth of requests to the distribution system (about announced time of broadcast start) and can make "*peak*" hard to serve and hard to simulate in among the testing phase, in spite of potential possibility of serving much more connections.

That estimated values must be designed for establishing the border values and limiting distribution dynamics as well (number of request cannot "*kill*" computer resources). You can get it by fixed qualification of cutting limits on the network devices and in the configuration of the streaming server, or, if system allows it, by more elegant dynamic transfer of request surplus to the broadcast broker, that is consequently, transfer of next requests to other servers permitted to serve it. Limits like that must exist because the "outside" server is open to DoS (*Denial of Service*) attacks, causing destability of the whole system as well.

The problem of the experimental selection makes also the arrangement of the streaming profiles - both as regards possibilities of the user receiving, getting broadcast qualities and aggregated number of possible simultaneous connections. It should be remembered, that modern broadcasting platforms require more power of the content coding machine and more power of the client PC decoding digital media, but at the same time they can make possible to transfer less data preserving better transmission quality. In scale effect it causes relative growth of possible streams, that is the number of the potential users.

None of distributing systems is full automatic. Often the best and the optimal parameters of the network broadcasting must be tune just in time of realization (increasing limits, priority of load, failure actions). Therefore preparation of the streaming live events must be always currently monitored by technical staff, who can in the short time restore whole system to normal work.

Facing The User

Various abilities of the user receiving extract application of a few efficiency profiles (capacities) for prepared stream. It can be done by distributing several simultaneous streams with accurate capacity



specification leaving the choice to the user, or, if distribution technology allows it, prepare so-called "*multistream*", dynamically switching transmission profile related to the user connection ability.

If the character of transmitted event permit it, it is worth to place beside of full audio-visual stream, alternative, "*light*" audio-only stream, for less requiring users, as well.

From The Stage To Player

Completely separate, but a very important matter is the range of the transmission service; not always delivered audio-visual signal is ready to plug strictly to place prepared for computer connected to network, serving coder role. It happens, that organizing live event transmission we have to assure an source of multimedia as well - thus own microphones and camcorders - or assure signal connection straight from audio-visual mixing console used by event sound provider. As noticed, the coder must have proper wide and faultless access to the network, so thus to distribution system. Not infrequently this connection has to be put together (using available in this place network media, or using wireless systems) especially for broadcasting requirements.

The Streaming Marketing

Besides technical part of undertaking the Internet content broadcasting, it can be taken into consideration also its marketing character. From one side, it requires earlier news item spreading about transmission in the accessible information channels; it requires creating separate web page with the link to the stream, links to essential software to download and installation procedure as well.

From the other side, the character of the streaming service, as an continuous data transferring, makes this service more susceptible to failure perception, and even short-time break in the access can cause breaking of the stream broadcast and user bitterness. In the "regular" services as WWW or e-mail account a dozen or so seconds of break to access the service might be even imperceptible.

It might be venture to embed the media player on the same web page, which will be easier for user's transmission receiving. The stream file should be run earlier than the planned time of the transmission; for that time in the stream can be shown the static information board, teledisc or jingel, which in right moment will be switched to the actual content, and after the end of the event the same board can in elegant style say "goodbye" to all users. In the meantime of broadcasting, if technology allows it, the half-transparent logotype of broadcast "*station*" can be put in the corner of the video display, in the classic TV way. Distinct from standard media, it is possible to show an additional meta-information simultaneously with transmission, including expanded content (as in the radio-broadcasting, RDS - *Radio Data Systems*) or more sophisticated tools of interactive players with steering included directly in stream as well.

During preparation of the streaming service and the estimation of the potential interest it's necessary to remember, that it is easier to disseminate live event transmission, which is exclusive in the Internet, that is in the same time none of classic media (especially public free television channels)



would be broadcast it. Exception of this rule is the radio stations retransmitted in the Internet, which as a audio-only media are not fully involved of the listener, and what follows, determine the digital "company" while other works on PC.

After-transmission Support

After the end of all the audio-visual transmission work it is worth to consider an option to put the material in VOD/AOD ("*video on demand*" or "*audio on demand*") mode fully or partly on the web page; it is peculiar alternative for all, who in various reasons (the access limits during live streaming also) cannot track event up-to-date. However, despite all positive aspects of this step differentiating Internet from the traditional media, the economical side of this solution must be taken into consideration, well, costs of the stream preparation to VOD broadcasting, the costs and the time of maintenance often very large digital materials on the distributing server, and possible range of the interested users. It is worth merely then, if this content in the course of time never lose his topicality.