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Point to point to peer to peer

There has been considerable coverage recently of the (successful) legal challenge to Napster.

Napster provides the capability for users to search MP3 files held on the hard disk drive of other users and (if both parties agree) facilitates file transfer and exchange. The recent court case requires Napster to limit the exchange to non-copyright material.

Napster's 'Achilles heel' was to have a central server through which users submitted requests - user files were sub-poenaed and used as evidence in court.

A number of music swapping servers have now evolved which relay requests directly to other user's hard drives - www.aimster.com and www.imesh.com are two examples. These services are harder to challenge in the courts (difficult for copyright owners to identify a suitable party against which to issue proceedings).

The practice of peer to peer (legal and non-legal!) file exchange between consenting users is therefore likely to continue to increase - a traffic generating revenue opportunity.

The question is whether such file exchanges are supportable technically over present and future wireless networks.

Music swapping usually involves the exchange of MP3 encoded files. A 5 minute song will typically be 50 Mbytes which compresses down to a 5 Megabyte MP3 file. A 64 Mbyte memory card will therefore hold about one hour of (MP3 encoded) music.

This suggests that peer to peer audio file exchange is feasible both in terms of memory and delivery bandwidth. Recent MP3 enabled products from Sony, Samsung and Panasonic are confirmation that practical hardware is becoming available.

However, given that 3G handsets are being designed to include CMOS imaging (digital cameras) and MP4 encoders (audio **and** video encoding), there is an implied need to support the peer to peer exchange of more complex files. MP4 for example includes meta descriptions - the basis for characterising and codifying complex content, in turn the basis for image/video search engines - rich media file search and exchange.

File sizes of several hundred megabytes imply an order of magnitude increase in memory and delivery bandwidth. An MP4 encoder will typically consume at least 200 milliwatts and you need enough RF power to transmit the file.

Realistically, the exchange of rich media files will be made feasible by a number of parallel developments - improved object based MP4 compression and encoding techniques, denser (more power efficient) radio networks and increased battery densities (watt hours per kg, watt hours per litre). In addition to providing the basis for a rich media search engine, the MP4 descriptor will describe the quality of service requirements - the delivery bandwidth metrics (isochronous or non-isochronous), media driven time dependencies (time stamping to maintain synchronisation between simultaneously encoded audio, video and data) and memory bandwidth requirements (buffer bandwidth).

Miniature disk drives provide one option for substantially increasing handset memory - IBM's recent announcement of a 1 Gbyte hard disk drive weighing 16 grams in a type II (5 mm) form factor provides an example.

If 10 million subscribers each had a 1 Gbyte disk drive, they would have shared access to 10 petabytes of distributed data (distributed rich media), substantially more powerful than a centralised server resource.

Note however how the peer to peer exchange of rich media implies a change in the way in which traffic is offered to a (wireless or wireline) network which in turn implies the need for new packet shaping/traffic shaping protocols and memory management methodologies.

Summary

Napster, Aimster and similar companies are providing the basis for an increase in peer to peer file exchange which in turn stimulates traffic and revenue.

The focus to date has been on the exchange of MP3 audio files, however the evolution of MP4 and parallel hardware developments (MP4 encoders/decoders, CMOS imaging, hard disk and solid state memory), implies an increase in the peer to peer exchange of complex content - rich media file search and exchange, which implies a review of presently proposed traffic and storage management techniques.

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