Information technology: Multimedia standards – what's next?

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Public interest in the ISO/IEC JTC 1/ SC 29 work programme for multimedia standards is high. The purpose of this short article is to build on this interest and make it clear to all concerned what standards SC 29 is currently developing and how they will be applied.

MPEG-4 for Mobile Applications

The recently developed MPEG-4 is targeted at audio/visual applications using mobile phone and other small hand-held equipment. It is designed for use with

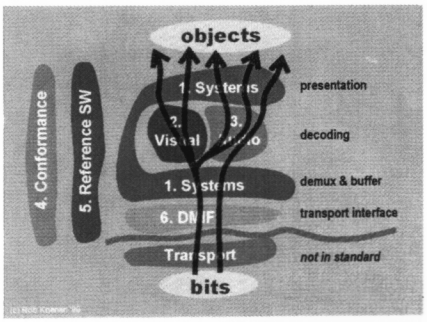

Fig.1 MPEG-4 multi-part structure

IMT2000 applications which transmit at a rate of 384Kbits/sec – 2Mbits/sec. MPEG-4 standard, ISO/IEC 14496 from WG 11, presents 3-dimensional images by independently constructing and superimposing several interactive audio-visual objects. The multi-part structure of MPEG-4 is similar to the well established existing MPEG standard approach. There is an informative technical report and separate parts for systems, video, audio, conformance testing and accompanying reference software. A new addition which is key to the object technology underlying the synchronization of the independently configured components is the DMIF *(Delivery* Multimedia Integration Framework). The relationship and function of the individual parts are shown in Fig. 1.

Extensions to MPEG-4 target higher transmission capacities, and amongst other topics enable a larger number of independent objects, additional powerful features in regard to scalable representation of audio and video, 3-dimensional scene composition with natural and synthetic video, and fine representation of 3-dimensional mesh and texture information. In addition there is broad consensus on standardizing additional interfaces in MPEG-4; which will address renewability of 'Intellectual Property Management and Protection' (watermarking, cryptographic algorithms, etc.), without standardizing the tools themselves. Users will benefit from this, because it will become easier to create interoperable secure systems, which will result in more transparent access to valuable content.

Fig.2 JPEG2000 can provide spacially scalable images.

Next Generation Images

JPEG2000, developed by SC 29/WG 1, is a next generation still image coding standard which is designed to provide Internet imaging, digital photo, printing, remote sensing and medical applications, etc. It scales gracefully as bandwidth is reduced or expanded by a smooth transition from lossless to lossy coding mode and vice versa. This capability is possible by the application of multi-scale wavelets instead of the more conventional block-based DCT (Discrete Cosine Transform). A very important feature and quality of JPEG2000 is that it allows precise control of the quality of selected parts of images that are user-selectable. This ability to select and display in greater detail sub-regions of particular interest is extremely useful in medical and other data critical applications. An enhancement of the basic JPEG200 provided by "Motion JPEG2000" will ensure that new state of the art digital cameras will be able to not only provide still image mode but will also provide a video-clip recording capability.

Future Multimedia Content

In recent years, many elements exist to build an infrastructure for the retrieval, delivery and consumption of multimedia content across a wide range of networks and devices while at the same time respecting and managing copyright and intellectual property rights. For example, SC 29/WG 11 is at present preparing MPEG 7 in the area of information retrieval and metadata descriptors. This is a standard for contents description which is intended to improve the retrieval process for information embedded in multimedia components. More generally, a new SC 29 work item, MPEG-21, is determining how the various multimedia components can fit together, and will be used to identify which new multimedia infrastructure standards may be required. If gaps in the infrastructure exist, MPEG-21 will develop and integrate standards in its Part 2, which is planned to start in 2001.

Impacting on tomorrow

The 400 international members of ISO/IEC JTC 1/SC 29 develop fundamental multimedia standards for digital representation of still image, video and audio. The established standards are part of everyday applied multimedia technology usage – MPEG, MP3, JPEG – and are essential to the user experiences of digital audio-visual technology all over the globe. The more recently completed standards and the current work programme are confidently expected to have a similar far-reaching impact on the future world of multimedia technology. □