COMIQS: Commerce through MPEG4 on the Internet with Quality of Services

Main Objective
The main objective of COMIQS is the technical and service validation of a set of new paradigms introduced by recent and on-going innovations in ISO/MPEG-4/VRML (Virtual Reality Modelling Language) and the Internet IETF. Within the convergence process of interactive multimedia applications—ranging from entertainment to engineering—the COMIQS achievements will be validated in the field of Electronic Commerce. The added value and specific contribution of COMIQS reside in the implementation and experiment of the following service and technical features:

- **All-media integration** in a 3D virtual catalogue integrating digital high quality multimedia with video, photo-realistic images and high quality sound.
- **Increased interactivity** with content such as objects contained in motion pictures, audio tracks, 3D objects i.e. not restricted to clickable icons or buttons or hypertext links (already available on Internet).
- **Real-time streaming** of all media into the user-sided scene, facilitating navigation allowing at the same time a better adaptation of the content presentation process to available network resources.
- **Placement of MPEG-4 into the Internet** context, in the spirit of ITU-H.225 and of IETF Audio-Visual Transport Group.
- **Quality of Service (QoS) management**, from best-effort to predicted QoS, encompassing scaleable services on a variety of access networks, from narrowband to broadband Internet.

COMIQS will focus on the exploitation of MPEG-4 added functionalities for the given applications.

It will also address the use of DMIF for QoS provision in heterogeneous network environments. On the Internet side, COMIQS will work towards a Request For Comments (RFC) for MPEG-4 over Real Time Protocol (RTP).

Technical Approach
COMIQS will implement a European MPEG-4 platform based on an open and interoperable multimedia client/server architecture, on IP/IPng-based transport systems. This architecture will be in compliance with the MPEG-4/DMIF model, and will support a JAVA based open and flexible application signalling framework, encompassing Internet application signalling concepts. It will also support Quality of Service (QoS) provision for IP/IPng-based transport systems.

This multimedia platform will consist of:

- a complete MPEG4 compliant object-oriented terminal.
- a multimedia server platform supporting audio-visual information and interactive 3D
graphics. This server will be able to provide content adapted to networks ranging from the current Internet service to high-bandwidth high-quality stream service.

**EXPECTED ACHIEVEMENTS**

COMIQS phase-1 will deliver after 12 months a version-1 of the client/server platform, supporting the following main features:

- Operation over IP/IPng-based transport systems without QoS management, and without end-to-end object time base.
- Application signalling: Stream service based on DSM CC UU and/or RTSP and file service based on HTTP.
- An MPEG-4/DMIF Application Interface.
- COMIQS’ terminal version-1 will include a complete decoding and presentation unit supporting MPEG-4 compliant audio/video decoding as well as an MPEG-4 compliant ‘parametric (Binary Information For Scenes : BIFS)’ scene description.
- COMIQS’ server version-1 will include adapted database management tools and executives (database queries, dynamic scene updates etc.) necessary to support the MPEG-4 electronic commerce applications.

This first platform will allow the demonstration of a first set of service functionalities—integrated 2D and 3D contents, higher degree of interactivity, real-time streaming of synchronised 2D AV and 3D media on Internet—in a first application configuration and the implementation of usability testing with real end users.

COMIQS phase-2 after two years will enhance the client/server platform version-1, incorporating the following extra features:

- Operation over IP/IPng-based transport systems—also on top of ATM—with QoS management,
- A complete open application signalling framework relying on JAVA,
- MIF compliant implementation of a DMIF/Network Interface for Internet (not specified yet in DMIF at the time of writing)
- COMIQS’ terminal and server version-2 with QoS provision, and possibly ‘programmatic’ scene description facilities.

**KEY ISSUES**

The key issues of COMIQS will be:

- to define user and service requirements, to design scenarios for two home shopping applications and to create contents and associated application executives.
- to develop the client/server MPEG-4 architecture on IP/IPng-based transport systems, using Real Time Protocols and Real Time Control Protocol (RTP/RTCP).
- to specify and to implement the mapping of the MPEG-4 buffer, timing and multiplexing model over RTP/RTCP, and to contribute to IETF on the definition of RTP payload for the transport of MPEG-4.
• to specify and to implement network signalling: this encompasses DMIF network interfaces at different levels, TransMux Instance able to create RTP connections, or FlexMux Channels multiplexed in a single connection.

• to specify and to implement application signalling—between peer applications, including stream, file and directory services—not addressed so far by DMIF. For the stream service, as an alternative to DSM CC UU, the project will also consider an open JAVA based application signalling framework encompassing the Internet streaming protocols e.g. RTSP.

• to investigate and to specify mechanisms to support dynamic bandwidth negotiation and QoS management. This encompasses interpretation and translation of generic QoS parameters (to be defined by DMIF) requested by the application into network specific QoS traffic parameters. For IP, possible standard solutions—RSVP—or proprietary solutions will be investigated.

• to specify and to implement the complete terminal architecture integrating the network and application signalling, demultiplexing and network adaptation, developed by the project with audio/video decoding, 3D rendering and presentation modules provided as background.

• to specify and to implement the complete server architecture supporting the developed applications. It will be built upon an existing DAVIC compliant server with significant extensions (communication and database management modules) towards the Internet and MPEG-4 DMIF model.

**SUMMARY OF TRIALS**

COMIQS will carry out three pan-European experiments covering service and technical aspects: two service experiments will involve respectively real end users and Electronic Commerce professionals, and will assess the market perspectives of COMIQS features. In two locations more than twenty users will be involved. The technical experiment will validate the MPEG-4 technology over the Internet, including QoS management provision, scaleable services on a variety of access networks.

**EXPECTED IMPACT**

COMIQS will contribute to the growth of Electronic Commerce business in Europe by introducing new service features. More generally, COMIQS technology will impact other sectors such as entertainment, distance education, collaborative engineering, telework, etc. and in turn the consumer electronic industry.

The placement of COMIQS’ open and interoperable framework on the Internet will strengthen the European technology position. COMIQS will contribute to the synergy and collaborative actions between ISO and the IETF.

The innovative features of COMIQS should result in new and attractive services on the Internet.