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**Community
Creation
Commerce**

Artwork by Anshe Chung Studios

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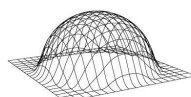
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Introduction to MPEG-V

Jean H.A. Gelissen, Philips Research

Keywords: virtual worlds, standards; MPEG-V.

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Introduction to MPEG-V

Jean H.A. Gelissen, Philips Research

Virtual worlds (often referred to as 3D3C for 3D visualization & navigation and the 3C's of Community, Creation and Commerce) integrate existing and emerging (media) technologies (e.g. instant messaging, video, 3D, VR, AI, chat, voice, etc.) that allow for the support of existing and new kinds of networked services.

The emergence of virtual worlds as platforms for networked services is recognized by businesses as an important enabler potentially reshaping the way companies interact with their environments (markets, customers, suppliers, creators, stakeholders, etc.). Such reshaping (which can be compared to impact of the Internet) will allow for the development of new breakthrough business models, services, applications and devices.

Each virtual world however has a different culture and audience making use of these specific worlds for a variety of reasons. These differences in existing virtual worlds permit users to have unique experiences. In order to bridge these differences in existing and emerging virtual worlds a standardized framework is required that will provide a lower entry level to multiple virtual worlds both for the provider of goods and services as well as the user.

In the future, virtual worlds will probably fully enter our lives, our communication patterns, our culture, and our entertainment -- never to leave again. Virtual worlds will be used for entertainment, education, training, getting information, social interaction, work, virtual tourism, reliving the past and forms of art. They will augment and interact with our real world and form an important part of people's lives. Many virtual worlds already exist as games, training systems, social networks, virtual cities and world models.

Technology improvement, both in hardware and software, forms the basis for the ongoing advancements in virtual worlds and their strong position as the platforms for 3D3C based applications and services. It is envisaged that the most important developments will occur in the areas of display technology, graphics, animation, physical simulation, behavior and artificial intelligence, loosely distributed systems and network technology. Furthermore, a strong connection between the virtual and the real world is needed to reach simultaneous reactions in both worlds to changes in the environment and human behavior. Efficient, effective, intuitive, and entertaining interfaces between users and virtual worlds are of crucial importance for their wide acceptance and use. To improve the process of creating virtual worlds a better design methodology and better tools are indispensable. For fast adoption of virtual worlds we need a better understanding of their internal economics, rules and regulations. Interoperability is a crucial aspect for fast adoption and commercial exploitation. This interoperability is achieved through international standardization like currently undertaken in the context of ISO/IEC's MPEG working group (SC29/WG11).

MPEG-V (Media Context and Control)

ISO/IEC 23005 is a new effort under ISO in the MPEG Working Group (the exact label is ISO/IEC JTC 1/SC 29/WG 11). The current top level MPEG-V architecture is now in its 3rd version (see figure 1 below), however not much additional change to this architecture is currently expected. The ITEA2 project Metaverse1 (www.metaverse1.org) is the initiator and a large contributor of / to MPEG-V. In fact, one of the core goals of the Metaverse1 project is to enable interoperability through standards, and MPEG is the carrier for that purpose. In some ways the Metaverse1 project strives to build the GSM of virtual worlds. Allowing both features and business value to its participants Metaverse1 includes about 30 organizations, big firms (Philip, Alcatel–Lucent), small firms and research organizations & institutes (such as Yesha's Metaverse Labs Ltd).

In particular, MPEG-V (ISO/IEC 23005) will provide an architecture and associated information representations to enable the interoperability between virtual worlds, e.g., digital content provider of a virtual world, (serious) gaming, simulation, DVD, and with the real world, e.g., sensors, actuators, vision and rendering, robotics (e.g. for revalidation), support for independent living, social and welfare systems, banking, insurance, travel, real estate, rights management and many others. This bridging will provide a lower entry level to multiple virtual worlds both for the provider of goods and services as well as the user.

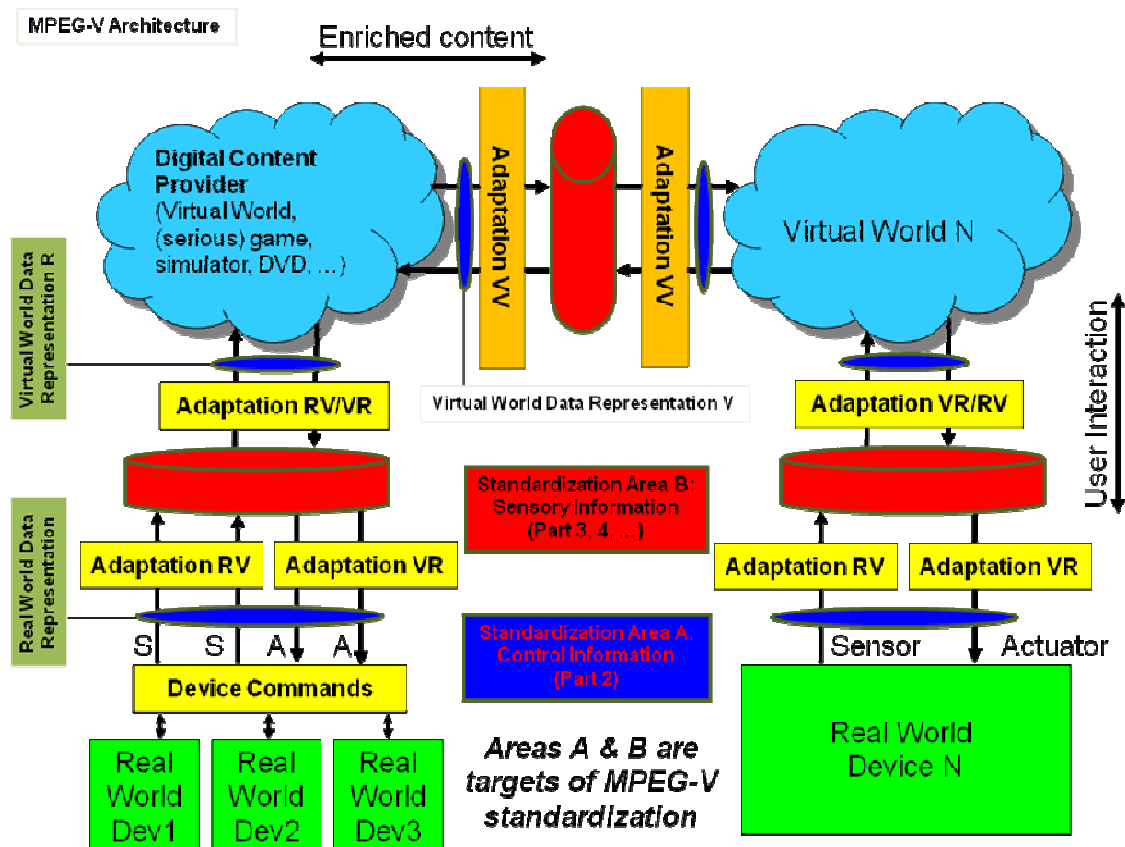


Figure 1: MPEG-V Architecture

In the MPEG-V standard the following areas are addressed:

Standardization Area A: Control Information

This standardization area covers the information representation of the control information to and from devices in the physical world and into and from the virtual world. Examples of these representations are the representation of sensory input devices like smart vision systems, environmental and body sensors and the like and sensory output rendering devices like lights, heaters, fans, displays, speakers and the like.

Standardization Area B: Sensory Information

This standardization area covers the (bidirectional) information representation of information exchanged between the physical world and the virtual world as well as the information exchange between virtual worlds. Examples of these representations are the representation of haptic, emotion and avatar information.

The MPEG-V standard currently comprises the following parts:

- Part 1: *Architecture*. (Gelissen 2009)
- Part 2: *Control information*.
- Part 3: *Sensory Information* (the most advanced part of MPEG-V, haptic, tactile, and emotion information also falls in this part but lacks of details at the time of writing this paper). (Timmerer 2009)
- Part 4: *Avatar characteristics*.

For further information concerning MPEG-V the interested reader is referred to the MPEG Web site. The development aspects of the MPEG-V standard are discussed within a so-called Ad-hoc Group (AhG) that is open to the public and interested parties are invited to join this exciting activity. Details about the AhG on MPEG-V can be found at the ISO/MPEG Web site.

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