MPEG-21 Introduction
Intellectual Property Management and Protection

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The MPEG standards

- MPEG-1
- MPEG-2
- Video coding standards
- Static
- Objects

- MPEG-4
- MPEG-7
- Content Management
- Description
- Lifecycle

- MPEG-21
The MPEG standards are “open” on two sides

- Methods for generation and consumption are not defined by the standards

**MPEG-21 the Multimedia Framework**

- Universal management of content, representing content based on user preferences and device capabilities, protection of rights, protection from unauthorized access / modification, protection of privacy of providers and consumers...
### MPEG-21

#### Digital Item

- **What**
  - A Digital Item is a structured digital object with a standard representation, identification and metadata within the MPEG-21 framework.

- **Who**
  - A User is any entity that interacts in the MPEG-21 environment or makes use of a Digital Item.

![Diagram](image)

Source: [Chiariglione.org/mpeg](http://Chiariglione.org/mpeg)

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### Multimedia Framework

- **Digital Item Declaration**
- **Digital Item Identification and Description**
- **Content Management and Usage**
- **Interoperability**
- **Protection**
- **Terminals & Networks**
- **Content Representation**
- **Event Reporting**

- **Examples**:
  - Encryption
  - Authentication
  - Watermarking
  - Natural and Synthetic
  - Scalability

- **Examples**:
  - Container, Item, Resource
  - Storage Management
  - Content Personalization
  - Resource Abstraction
  - Resource Management (QoS)
  - Service & state reference mechanisms
  - Support for usage tracking

![Diagram](image)

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Digital Rights Management

- Is MPEG trying to tame the hackers?
- DRM is a necessity, not only for industry support, but for a global market
- DRM will refer to the general issue of digital rights management, while Intellectual Property Management and Protection (IPMP) will denote MPEG specifics
- MPEG-21 explains the basic concepts of a machine-interpretable language for expressing the rights of users and content
- Does not provide specifications for security in trusted systems, pose specific applications, or describe the details of the accounting systems required.
- It does describe the language’s syntax and semantics

IPMP using ‘hooks’ approach

- IPMP in MPEG 2 and 4 (version 1) used the ‘hooks’ approach
- Plug-in a proprietary IPMP system
- Embed information into content streams that informs the terminal which proprietary IPMP system to use
- The reason was cost/benefit trade-off, one size did not fit all (e.g. TV and PDA)
- Downside: Limits interoperability, heavier terminal environment, risk many similar MPEG devices being built without inter-working
New IPMP approach

- More generalized architecture
- Provider lists authentication methods, recipient selects one
- Terminal can get IPMP Tools embedded in content or by downloading it
- Still based on hooking but uses Message Routing Service to simplify
- Audit agencies can provide Trust and Security metadata

Digital Rights Management

MPEG-21
Rights Expression Language

- REL is seen as a machine-readable language that can declare rights and permissions using the terms as defined in the Rights Data Directory (RDD)

- The principal to whom the grant is issued
- The right that the grant specifies
- The resource to which the right in the grant applies
- The condition that must be met before the right can be exercised
- REL is supported by Rights Data Directory (RDD)

MPEG-21

Conclusion

- Open standard-based framework for multimedia delivery and consumption?
- Enables the use of multimedia resources across a wide range of networks and devices
- Consists of Users that interact with Digital Items
- No technical distinction between providers and consumers
- Glues all kinds of multimedia content together
- Digital Rights Management infrastructure