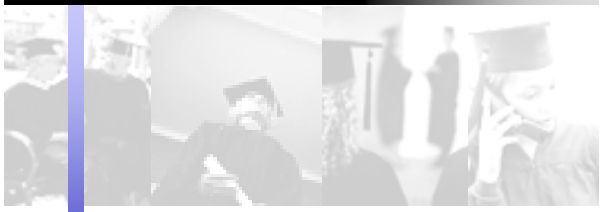

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MPEG-21 Digital Item Adaptation FDAM/2

Dynamic and Distributed Adaptation

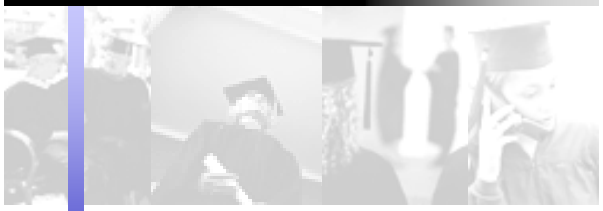
78th MPEG Meeting, Hangzhou, China

Editors: Christian Timmerer, Sylvain Devillers, and Michael Ransburg

ISO/IEC JTC1/SC29 WG11 MPEG MOVING PICTURE EXPERTS GROUP

Danae

MPEG@ITEC



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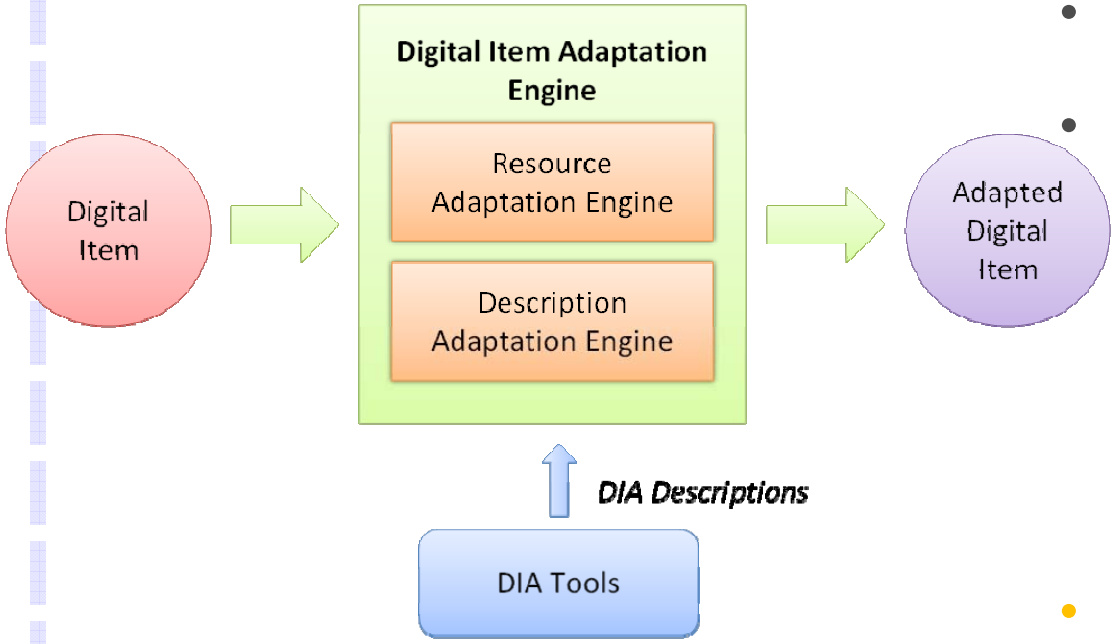
MPEG-21 DIA Overview

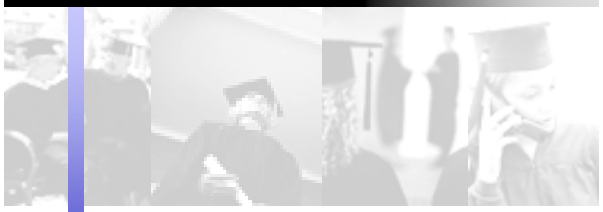


- Universal Multimedia Access in MPEG-21
- DIA specifies the syntax and semantics of tools that assist in the adaptation of Digital Items

DIA is used to satisfy transmission, storage and consumption constraints as well as Quality of Service management

- **Published 2004-10-15**

Tools: Usage Environment Description (UED), Bitstream Syntax Description Language (BSDL), AdaptationQoS, Universal Constraints Description (UCD), Metadata Adaptability, Session Mobility, DIA Configuration



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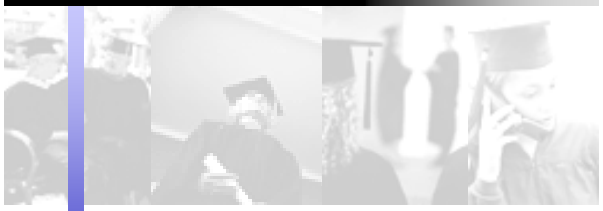
DIA Amd.1: Conversions and Permissions

- **Capabilities ➔ description of adaptation capabilities of a terminal**
- **Conversion link ➔ description of adaptation operation (e.g., image cropping) and parameters of the adaptation (e.g., x-y offset, width and height of cropped region)**
- **CrossConversionQoS ➔ relationship between different conversion options and its utility (e.g., transcoding, transmoding, transforming)**

- **Permitted DIA changes / change conditions ➔ Rights expression must be used to enforce adaptations that are permissible, e.g., by content owners**
  - EXAMPLE 1: Audio file can be played if the bit-rate is less than 64kbps
  - EXAMPLE 2: Video file can be played if the only format change is spatial resolution reduction that maintains aspect ratio and the spatial resolution is less than 352x240

- **Rights expression must also be used to protect user-sensitive info specified by DIA, e.g., user characteristics**

- **Published 2006-04-01**



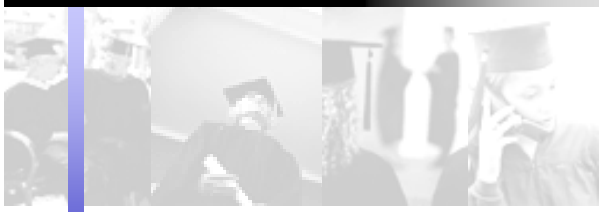
DIA Amd.2: Dynamic and Distributed Adaptation

- **Dynamic Adaptation**
  - Dynamic adaptation refers to the adaptation of Digital Items according to dynamically changing usage environments

    EXAMPLE: The available bandwidth may drop during a streaming session and the Digital Item is consequently adapted to this new usage environment.
- **Distributed Adaptation**
  - Distributed adaptation refers to multiple adaptation steps successively performed on different MPEG-21 peers

    EXAMPLE: A same resource may be successively adapted on a server, network node and/or terminal (e.g., multicast, session mobility).
- **Process Units**
  - A process unit is a well-formed XML fragment that can be consumed as such by the MPEG-21 peer, and to which a time information may be attached, indicating the point in time when it becomes available for consumption

    NOTE: A process unit is a processing-oriented concept rather than a delivery-oriented concept. It does not depend on any encoding method used for delivering it.



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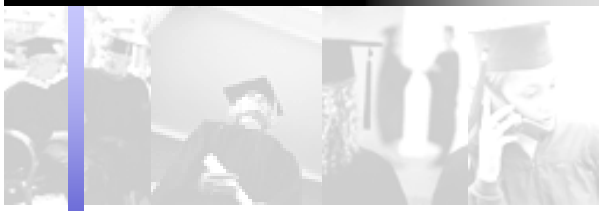
DIA Amd.2: Tools Overview

- **Minor additions to UED tool**
  - add'l codec capabilities, REL cap., minor updates to network cap., AdaptationQoS, ...
- **StreamingRefType**
  - signaling of buffer information required for streaming scenarios
- **Various updates on BSDL**
  - add'l data types and support for emulation prevention bytes
  - attributes for efficienct context management
- **Media Resource Streaming Instructions**
  - Tool for enabling the streaming of bitstream described by a Bitstream Syntax Description (BSD)
- **XML Streaming Instructions**
  - Tool for describing Process Units and assigning time information to them
- **Properties Style Sheet**
  - Tool for dynamically applying media resource or XML streaming instructions to an XML document (i.e., BSD, AdaptationQoS)



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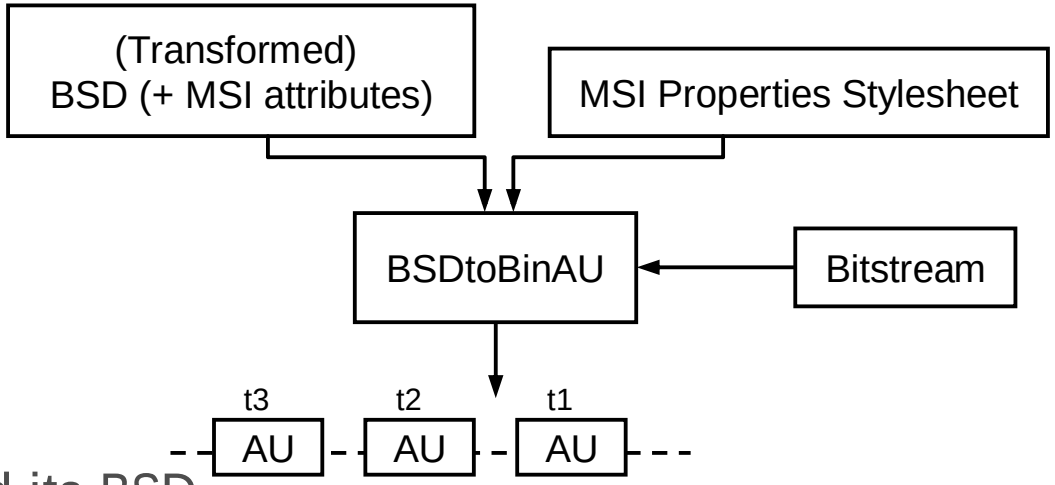
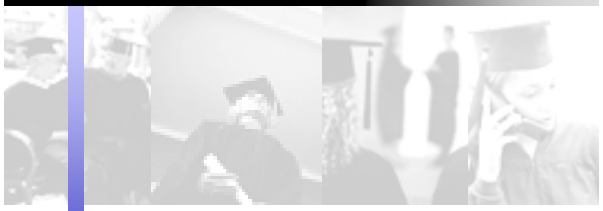
Media Resource Streaming Instructions



- **Input**
  - Bitstream and its BSD
  - Media resource streaming instructions: maybe embedded in the BSD or as external Properties Stylesheet
- **Output**
  - Access units and possibly access unit parts with associated time stamps



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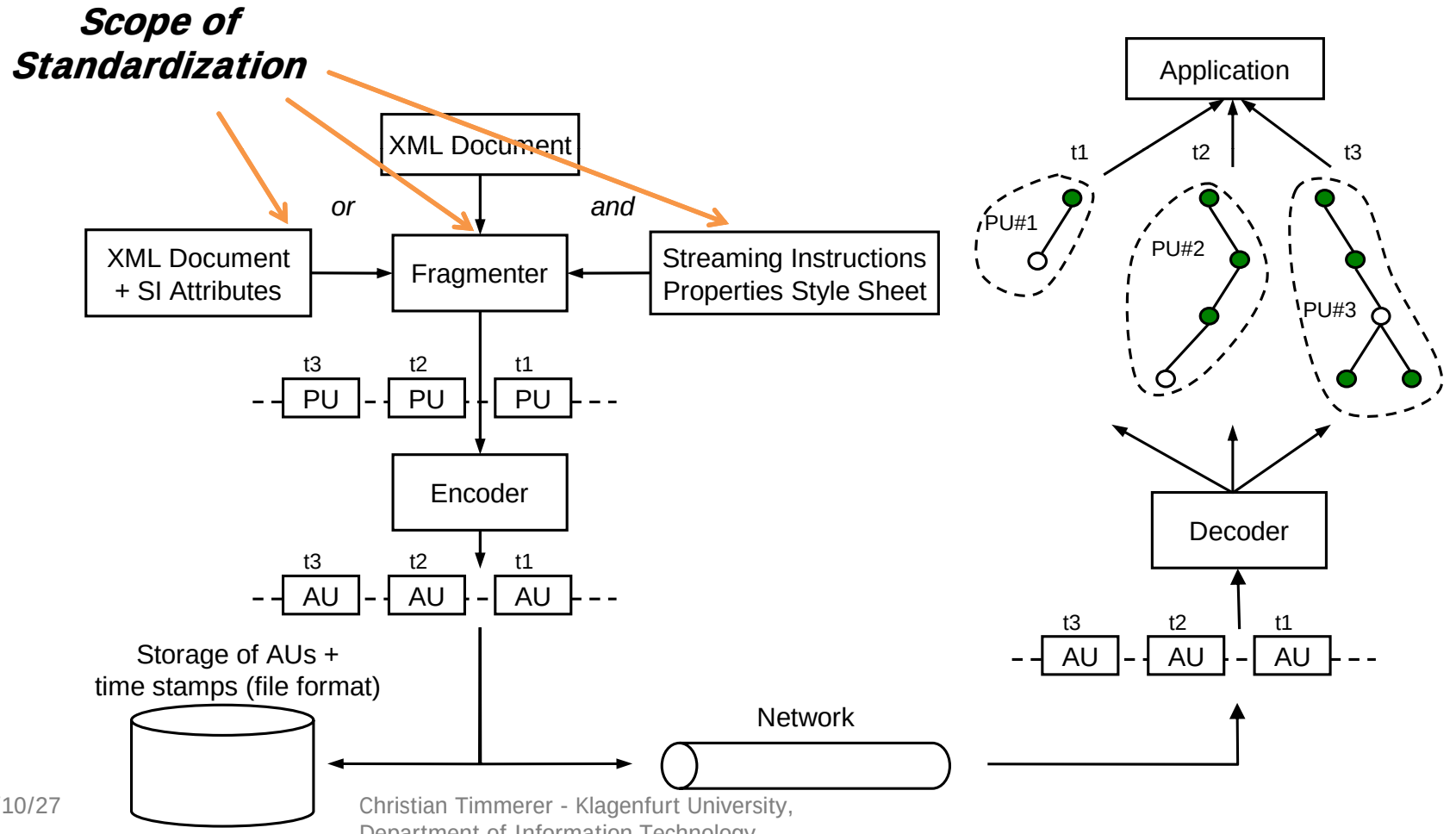
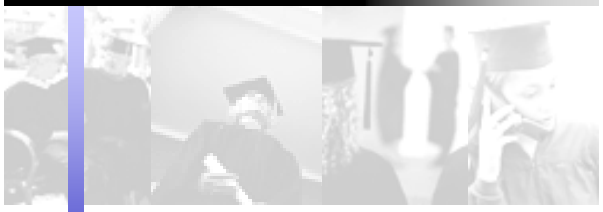
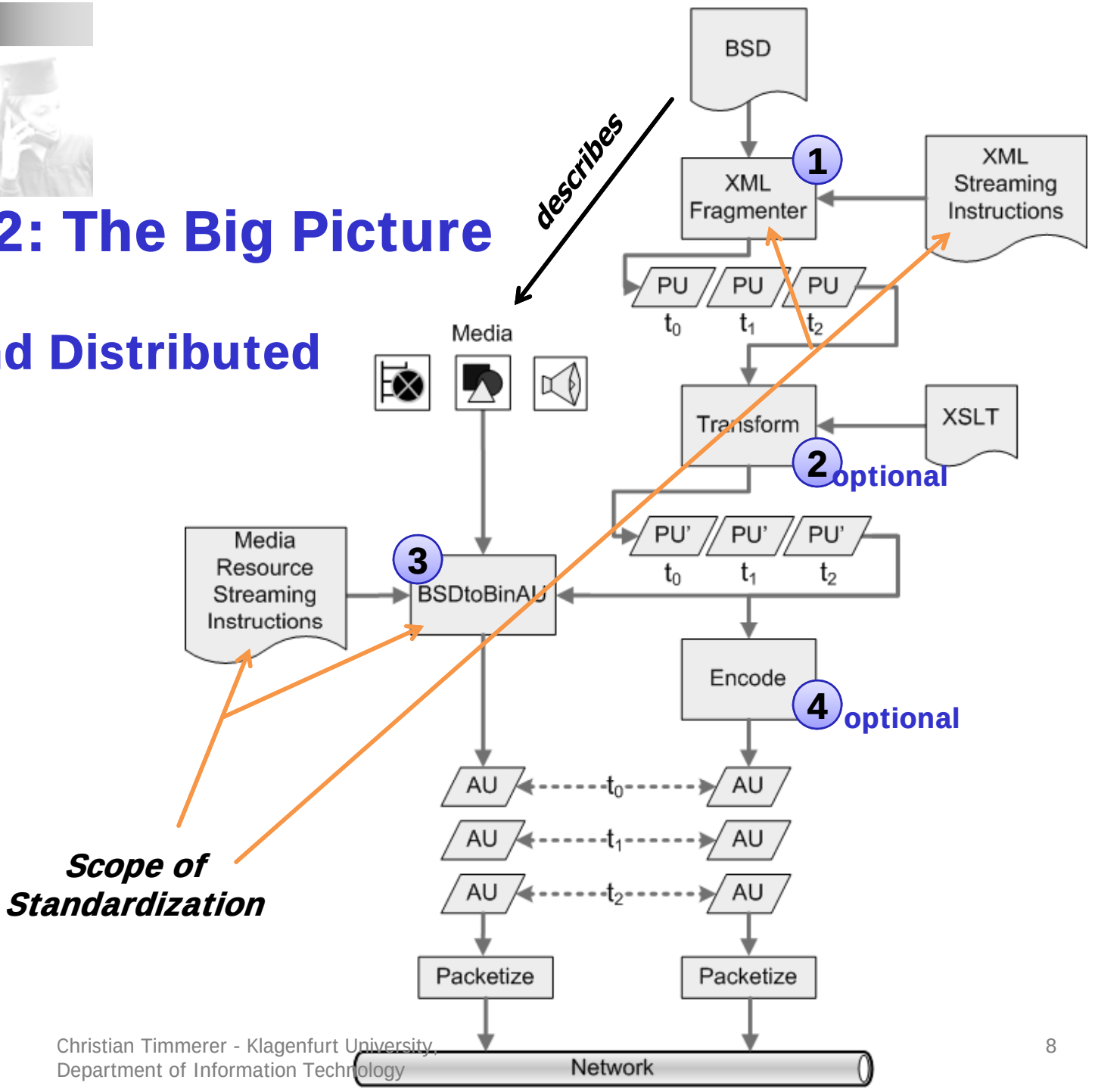
XML Streaming Instructions

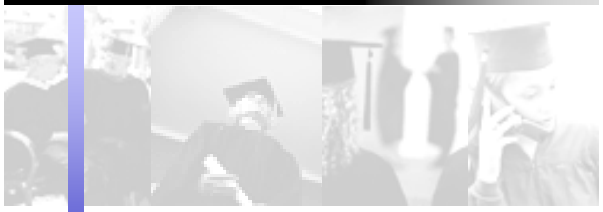




DIA Amd.2: The Big Picture

Dynamic and Distributed Adaptation





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Thank you for your attention

questions, comments, etc. are welcome ...

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