



# **ENTHRONE II**

## **WP-3 Technical Demonstration**

### **Dynamic and Distributed gBSD-based Adaptation of Scalable Video Coding**

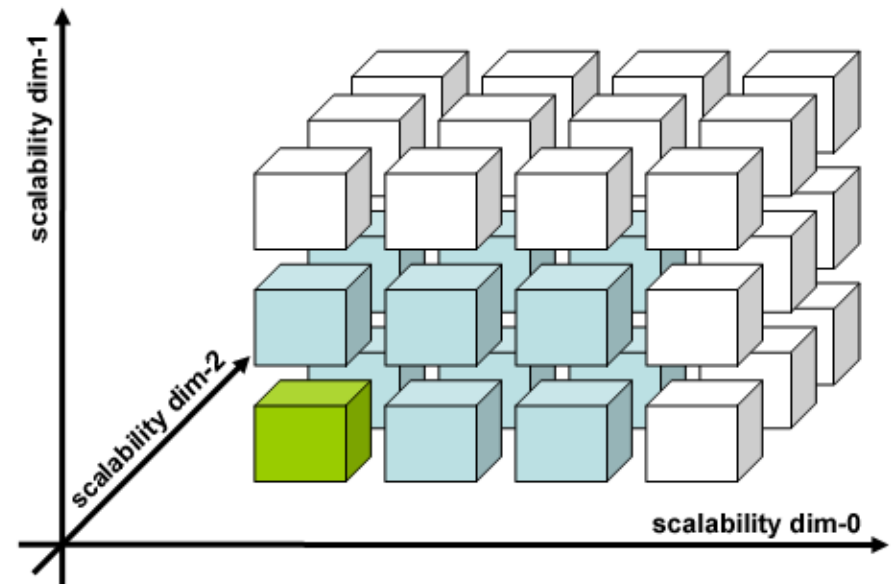
**Hubert Gressl**

**Klagenfurt University (UNIKLU) ♦ Faculty of Technical Sciences (TEWI)**  
**Department of Information Technology (ITEC) ♦ Multimedia Communication (MMC)**



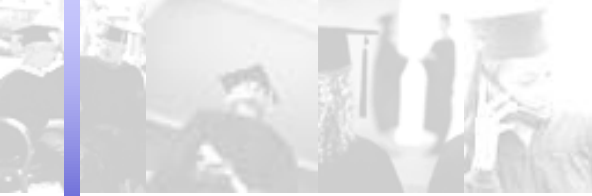
# Introduction – Scalable Video Coding

- Organization of scalable bitstreams in layers, levels, tiers, parcels  $\Rightarrow$  hypercube
- Encode once, then truncate layers (or bits) for lower quality / resolution ...
- Requires relatively simple operation: remove, update, (insert)



[D. Mukherjee, et.al., **A Framework for Fully Format-Independent Adaptation of Scalable Bit Streams**, *IEEE Trans. on Circuits and Systems for Video Technology*, vol. 15, no. 10, pp 1280-1290, Oct. 2005]

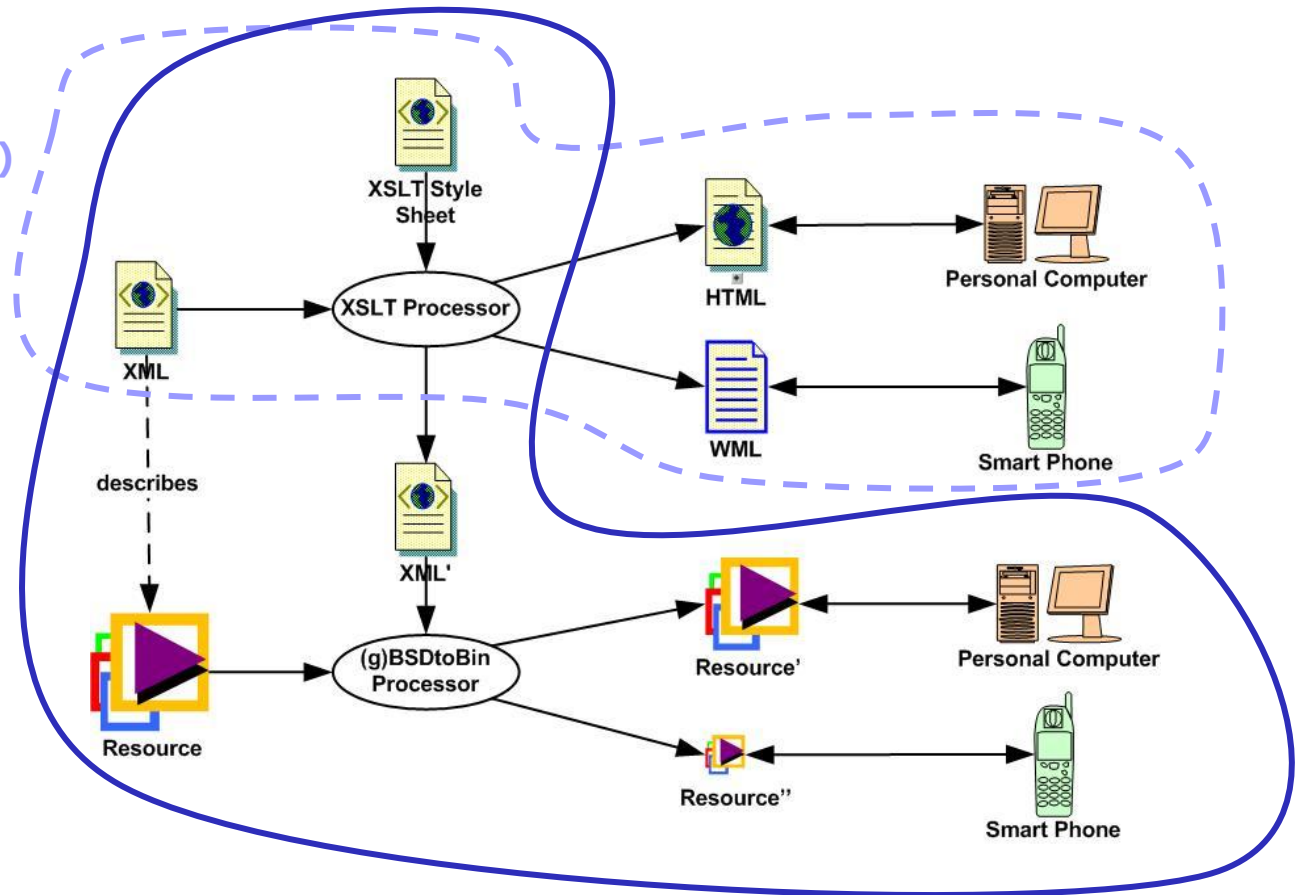
[S. Lerouge, et.al., **Fully Scalable Video Coding in Multicast Applications**, *SPIE Electronic Imaging: Science and Technology 2004*, vol. 5308, pp. 555-564, (San Jose, CA, USA), January 2004.]

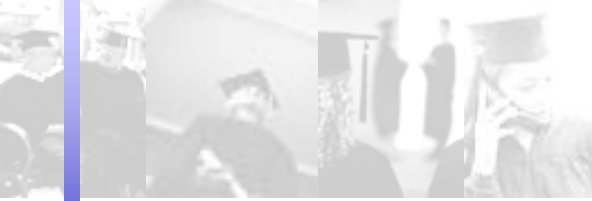


# Introduction – gBSD-based Adaptation

traditional  
Web (XML/XSLT)  
publishing

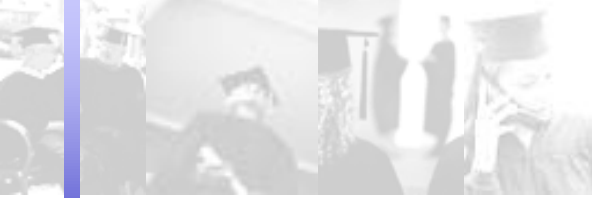
gBSD-based  
multimedia  
“publishing”





# Demonstration Description

- **Distributed gBSD-based adaptation**
- **Management by EIMS subsystem**
- **Focus on content handling and signalling**
- **XML-based exchange of control information**
- **Metadata transformation in XML-domain and BiM-encoded (binary) domain**



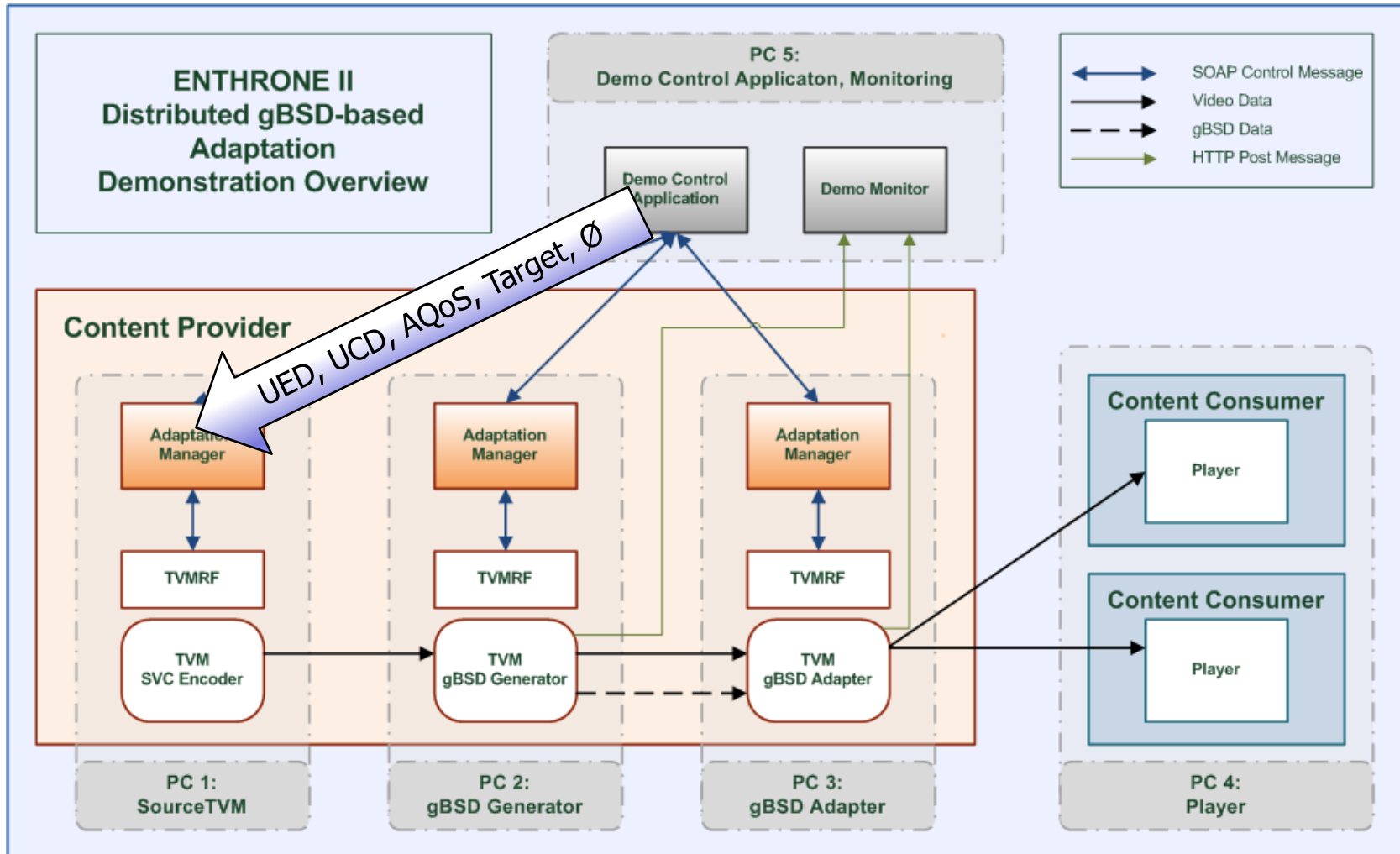
# Components

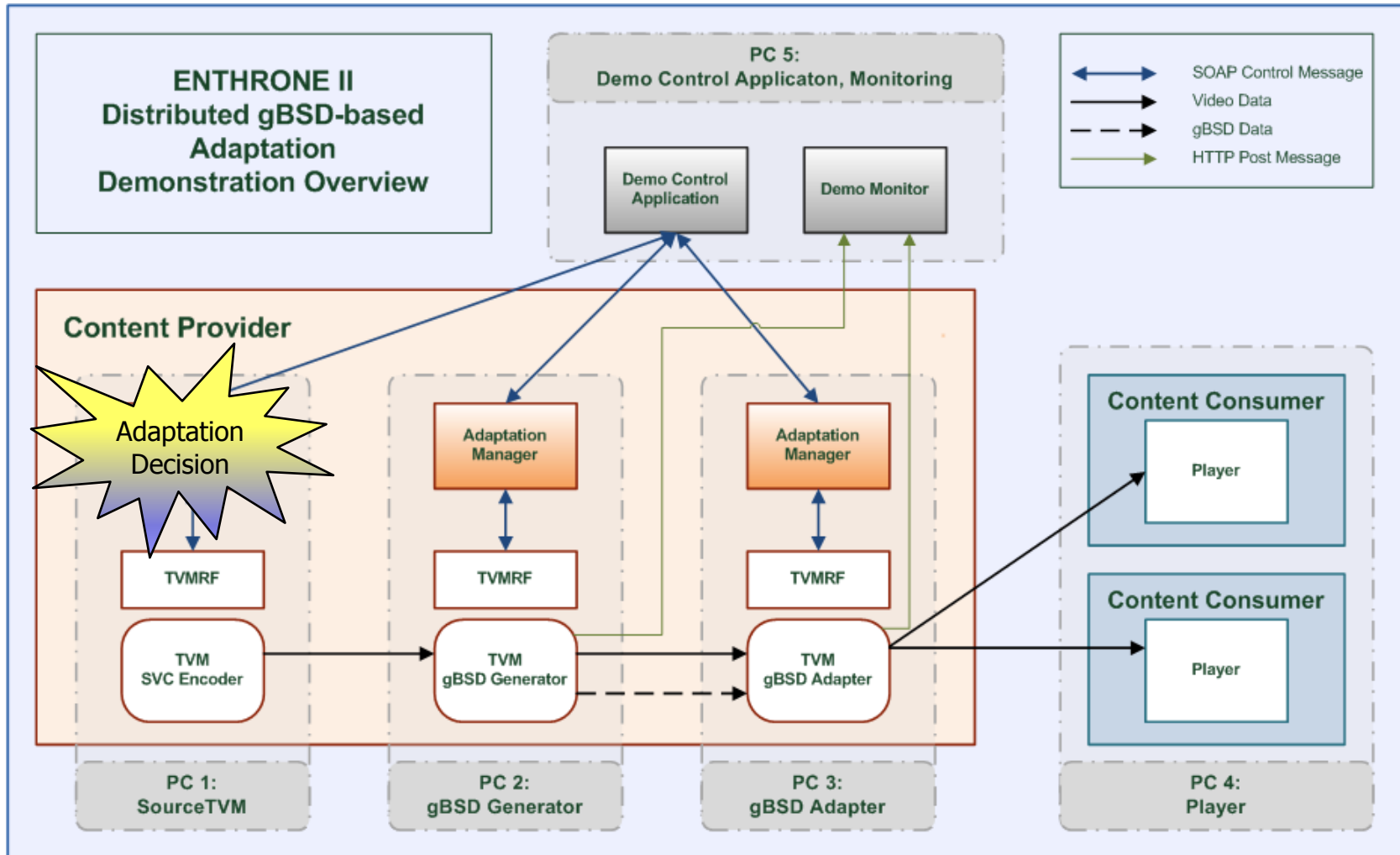
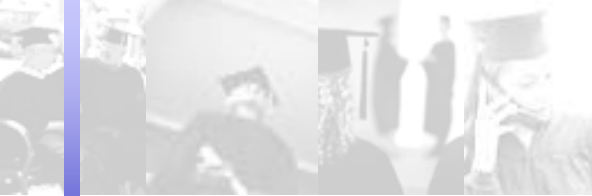
- **EIMS subsystem**
  - Adaptation Manager (UNIKLU)
  - Demo Control Application (UNIKLU)
    - Simulates Customer Service Manager
- **Content handling**
  - SVC Encoder TVM (BSOFT)
  - gBSD Generator TVM (Siemens/UNIKLU)
  - gBSD-based Adapter TVM (Siemens/UNIKLU)
  - SVC Player (BSOFT)
- **Non-ENTHRONE**
  - Demo Monitor (UNIKLU)



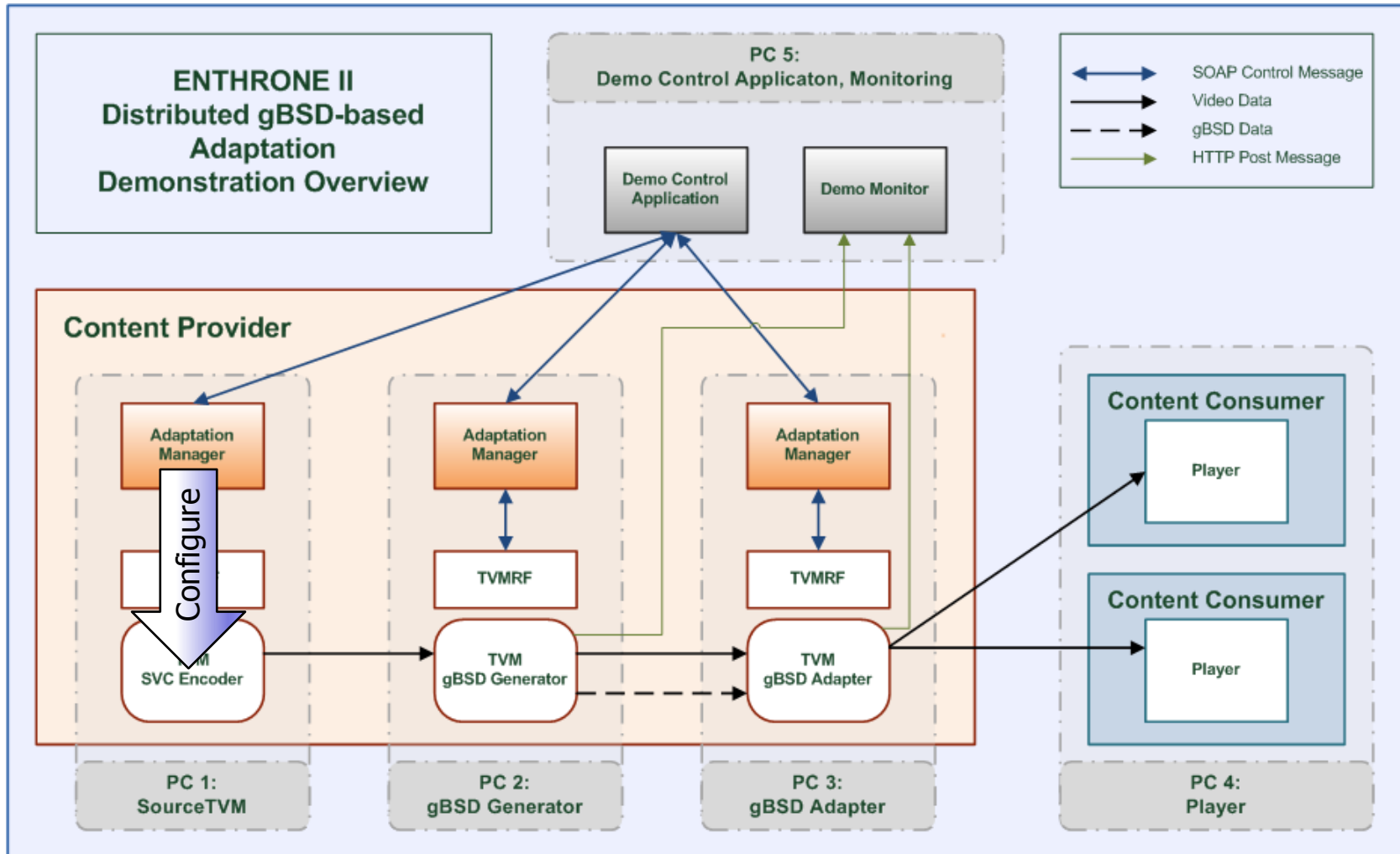
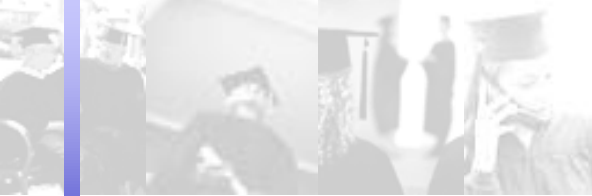
# Components Details

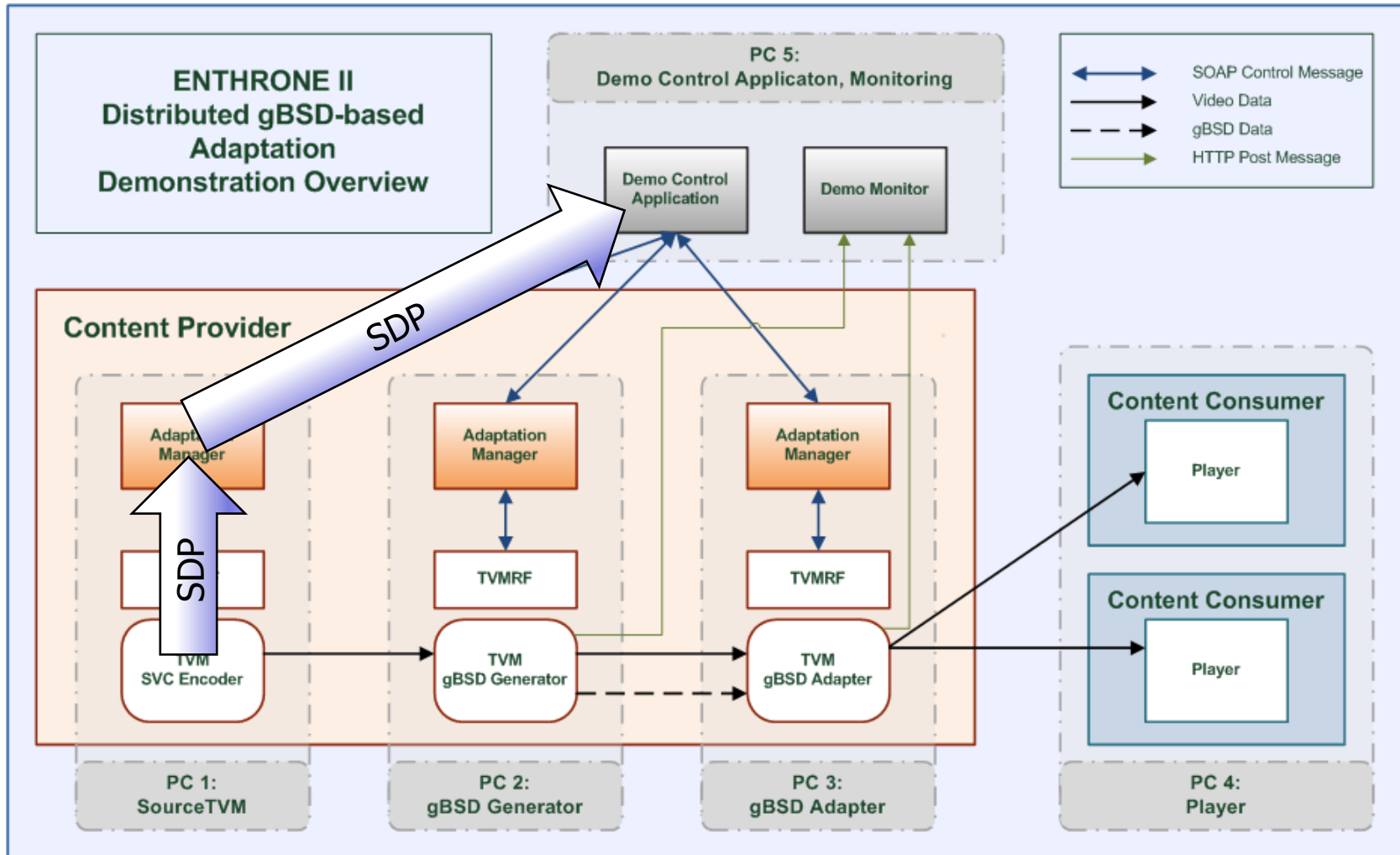
- **SVC Encoder TVM**
  - Streams SVC in single NAL unit RTP mode
  - 3 temporal layers
- **gBSD Generator TVM**
  - Generates gBSD on packet level
  - BiM compression
- **gBSD Adapter TVM**
  - 2 processing modes
    - XML-domain processing (XSLT, gBSD2BIN)
    - Binary-XML processing (Streaming Transformations for BiM [STB])
  - Synchronisation based on RTP sequence number

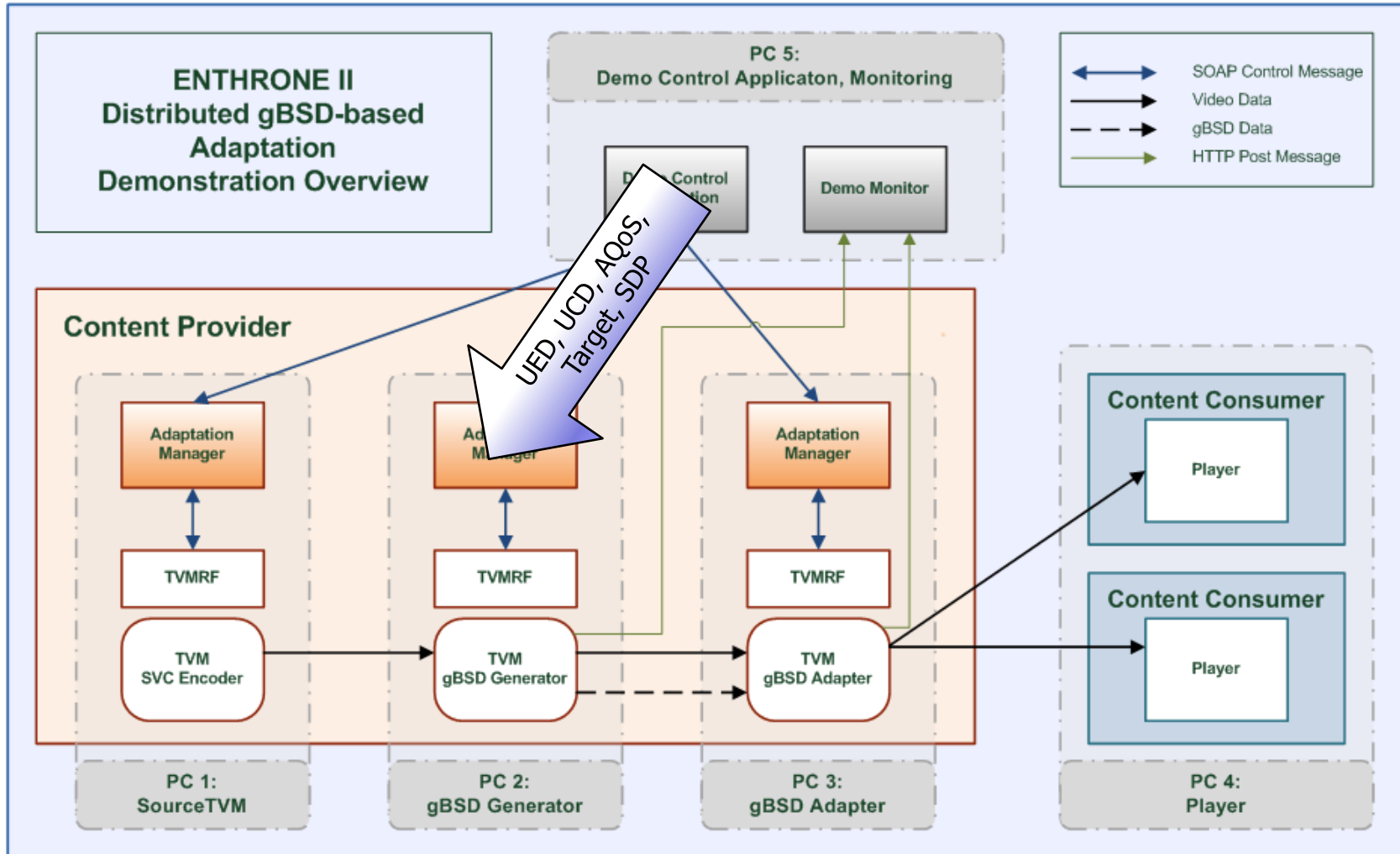
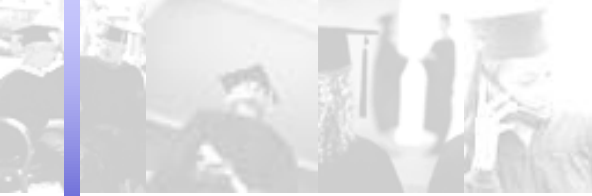


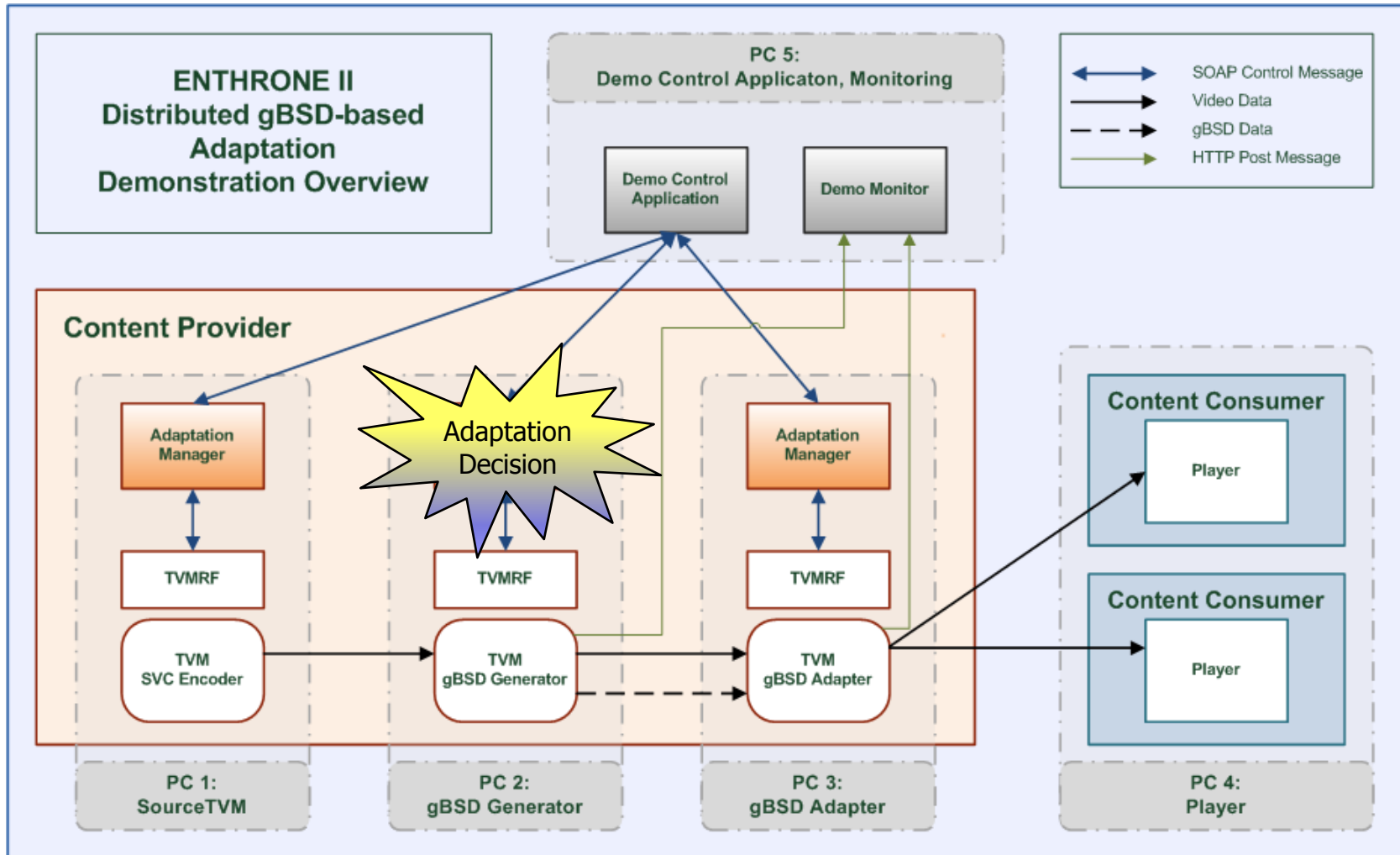


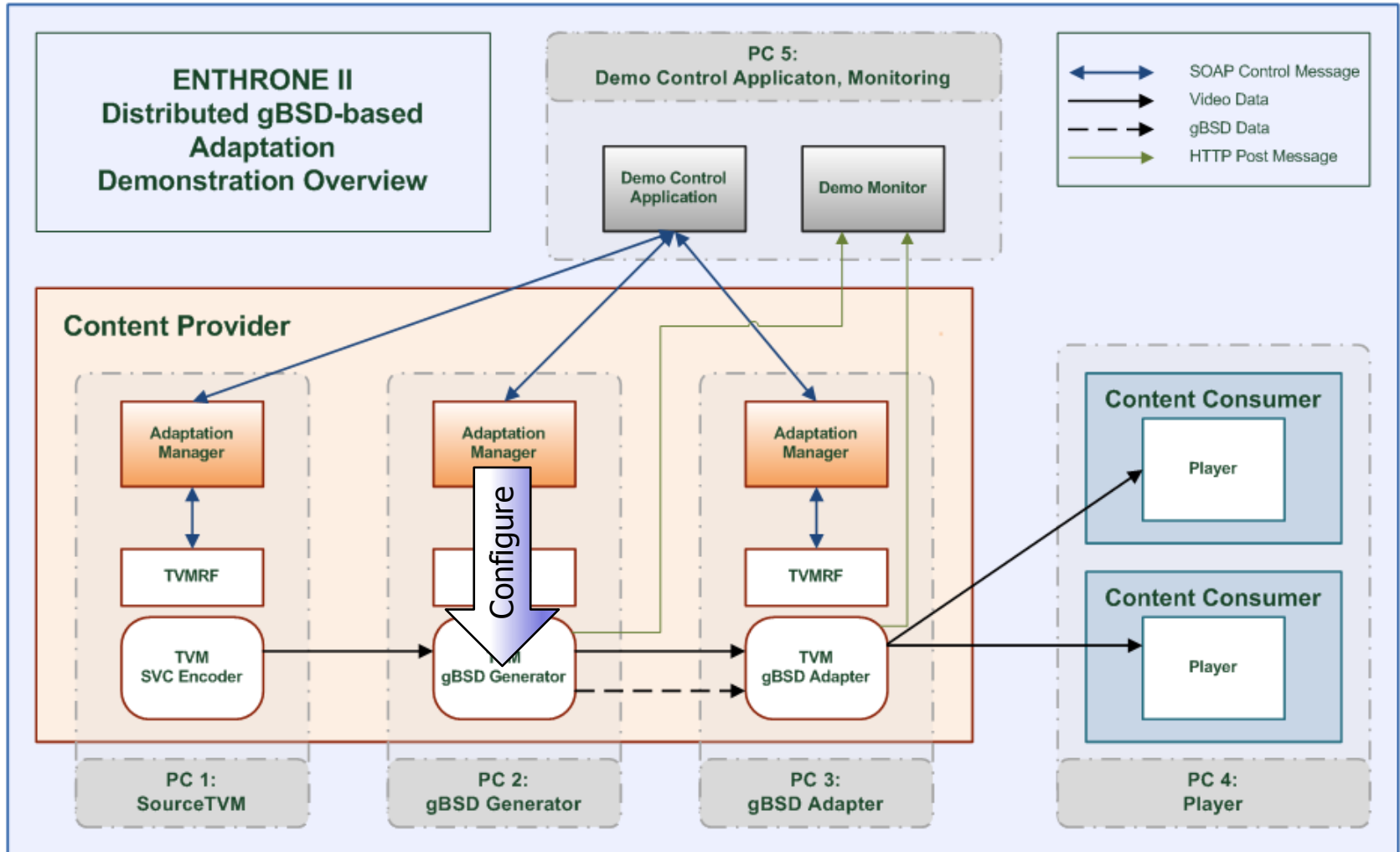


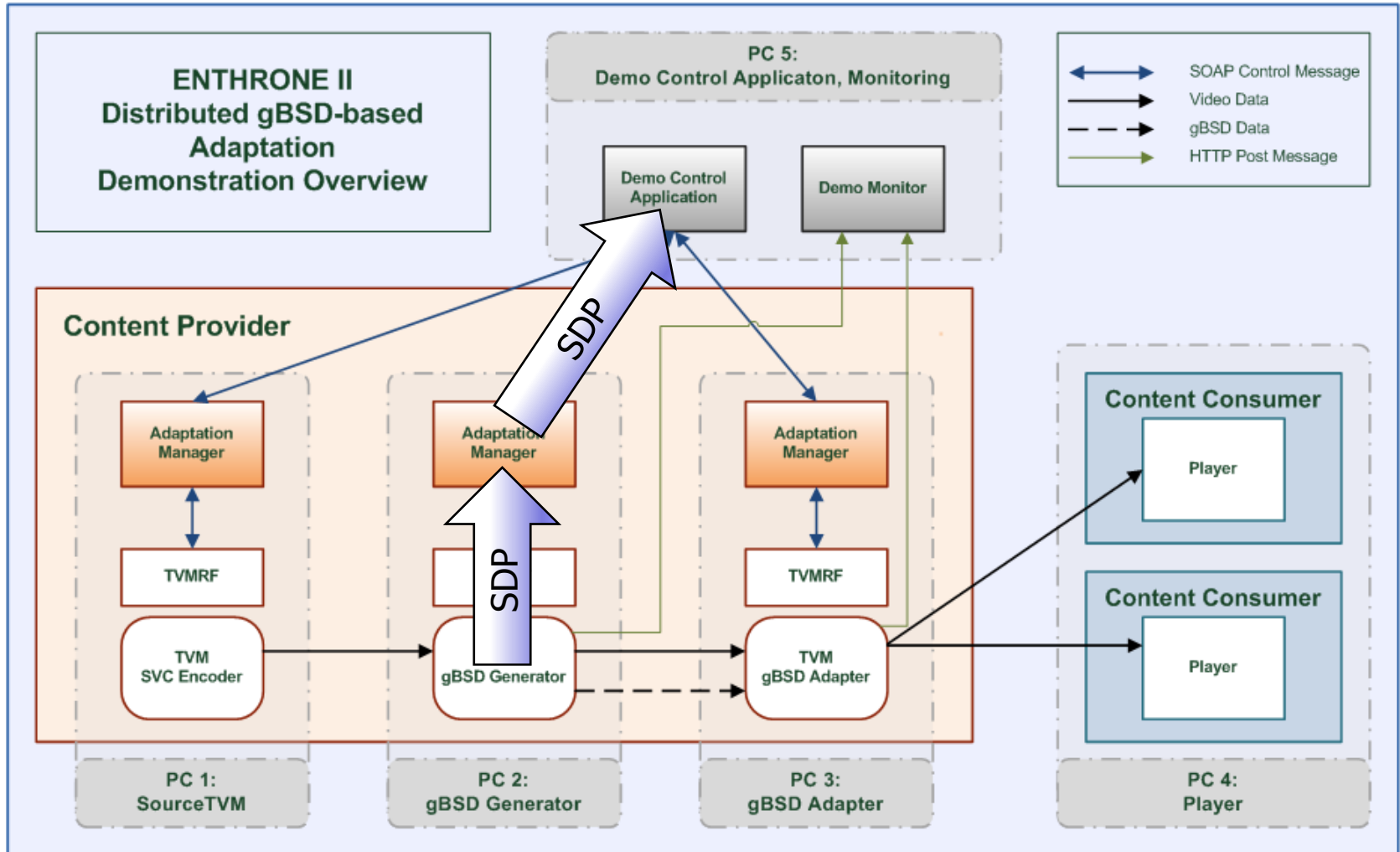
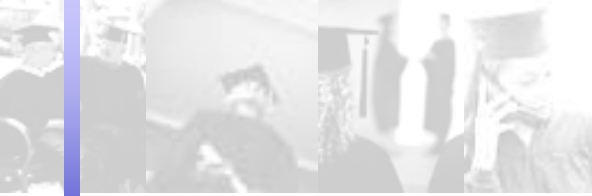


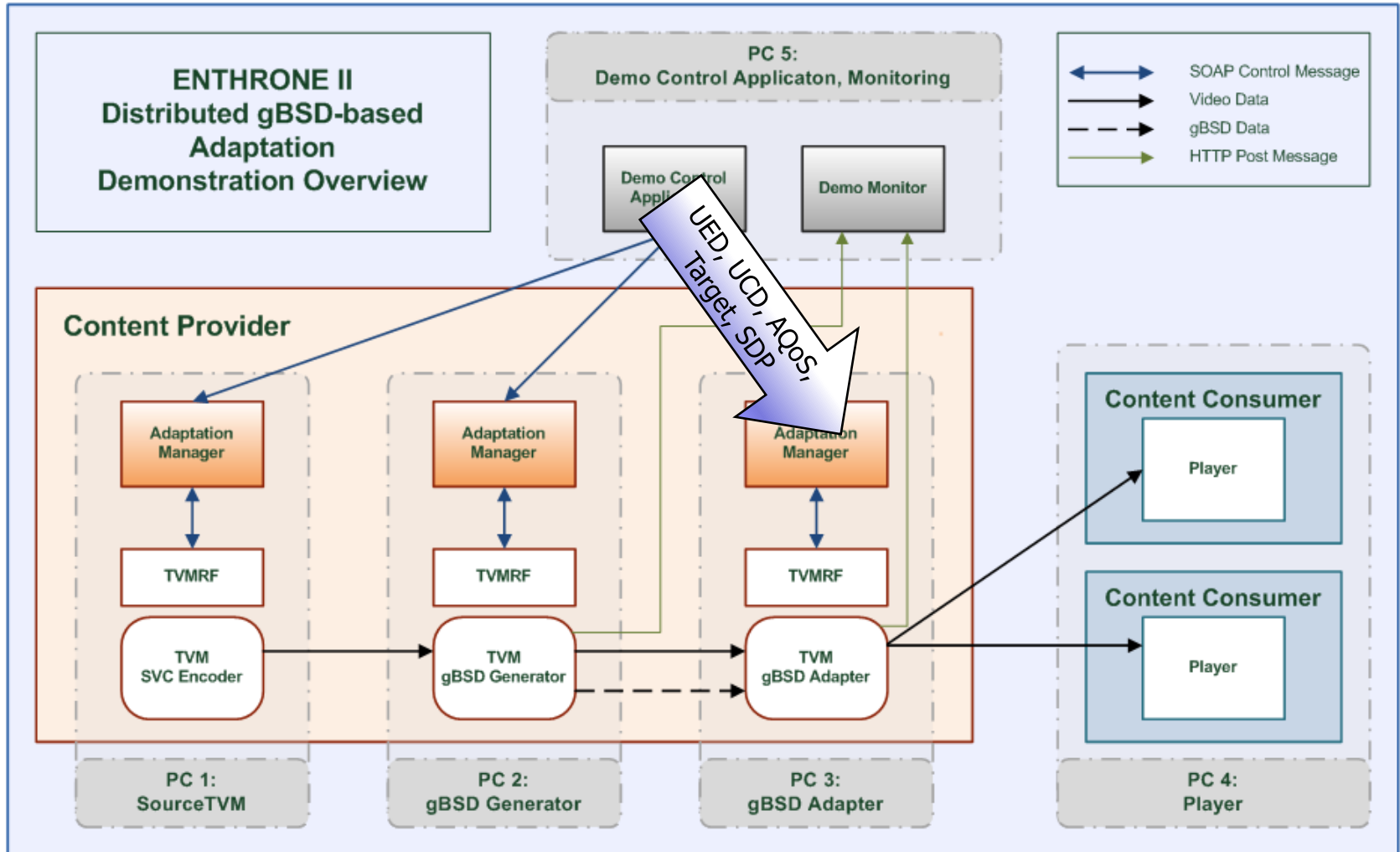


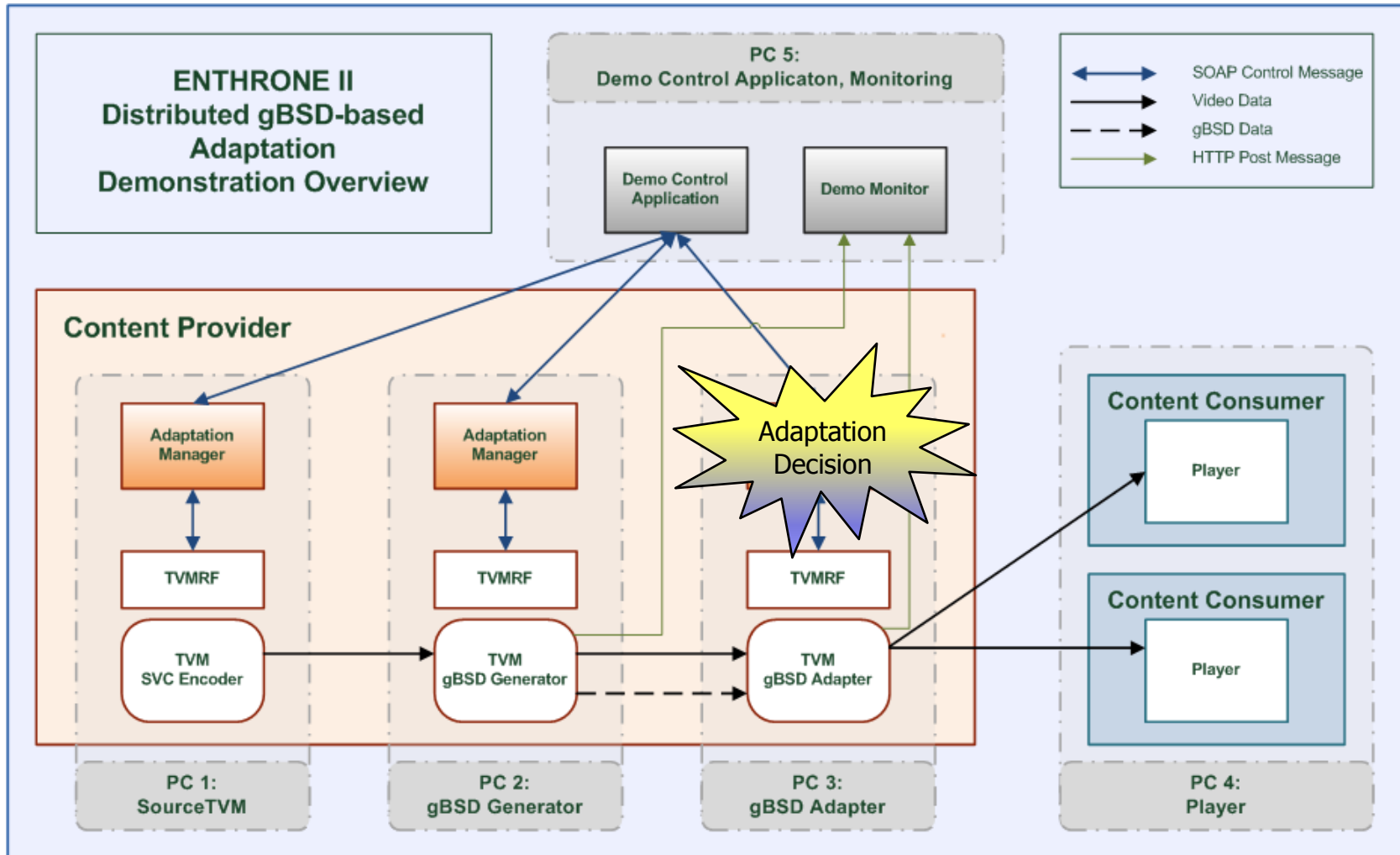




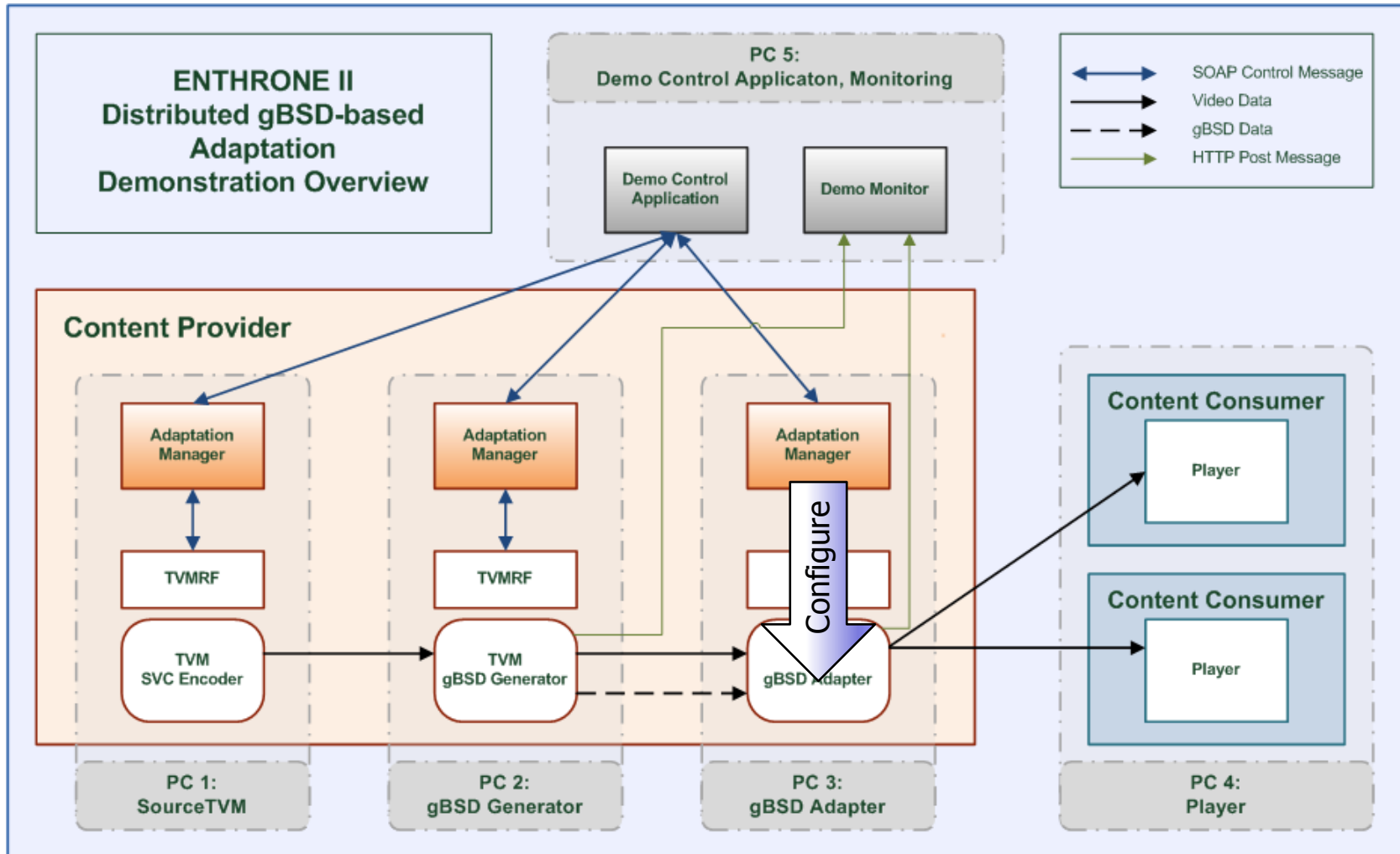


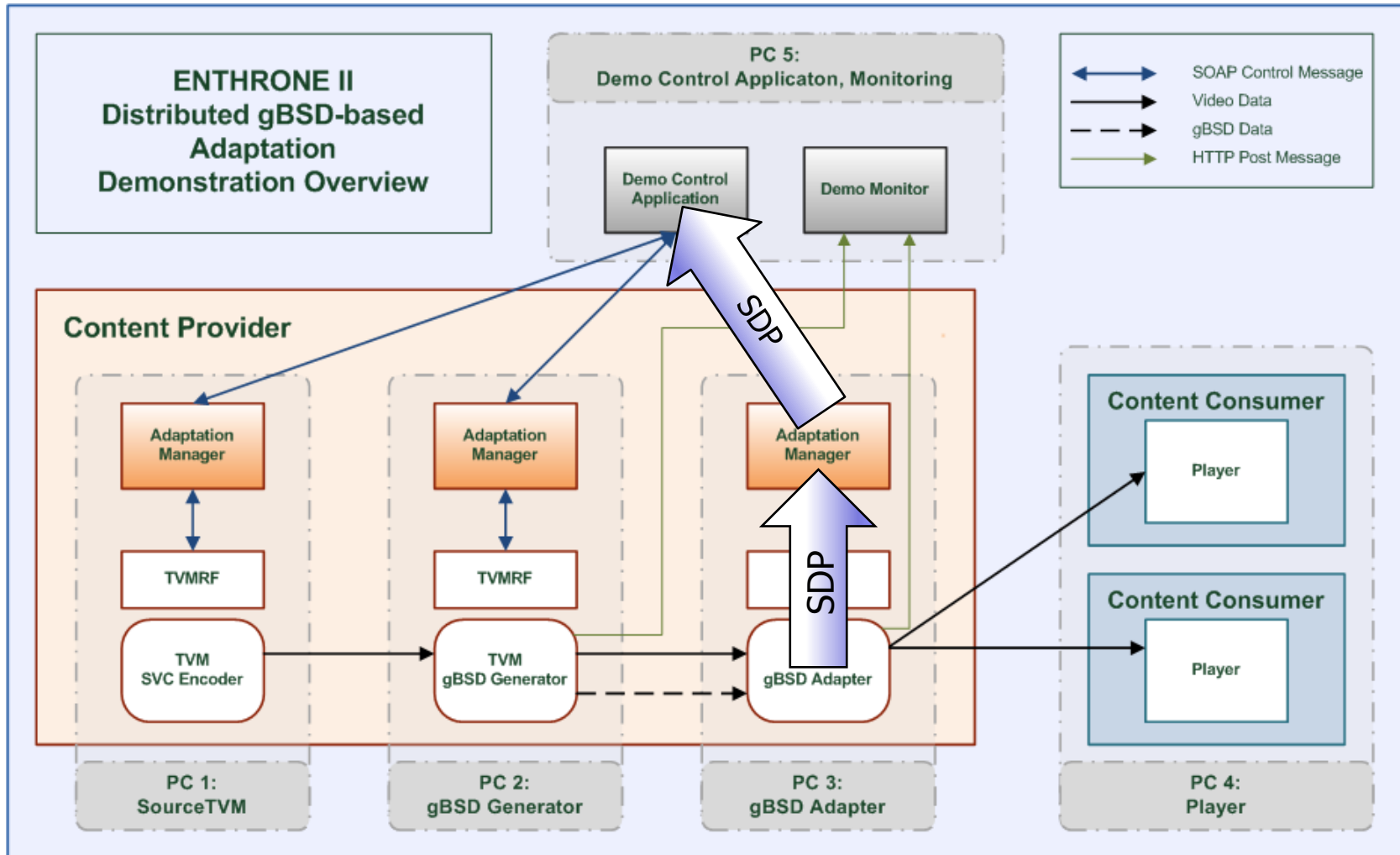
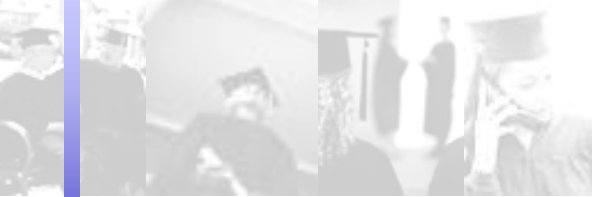


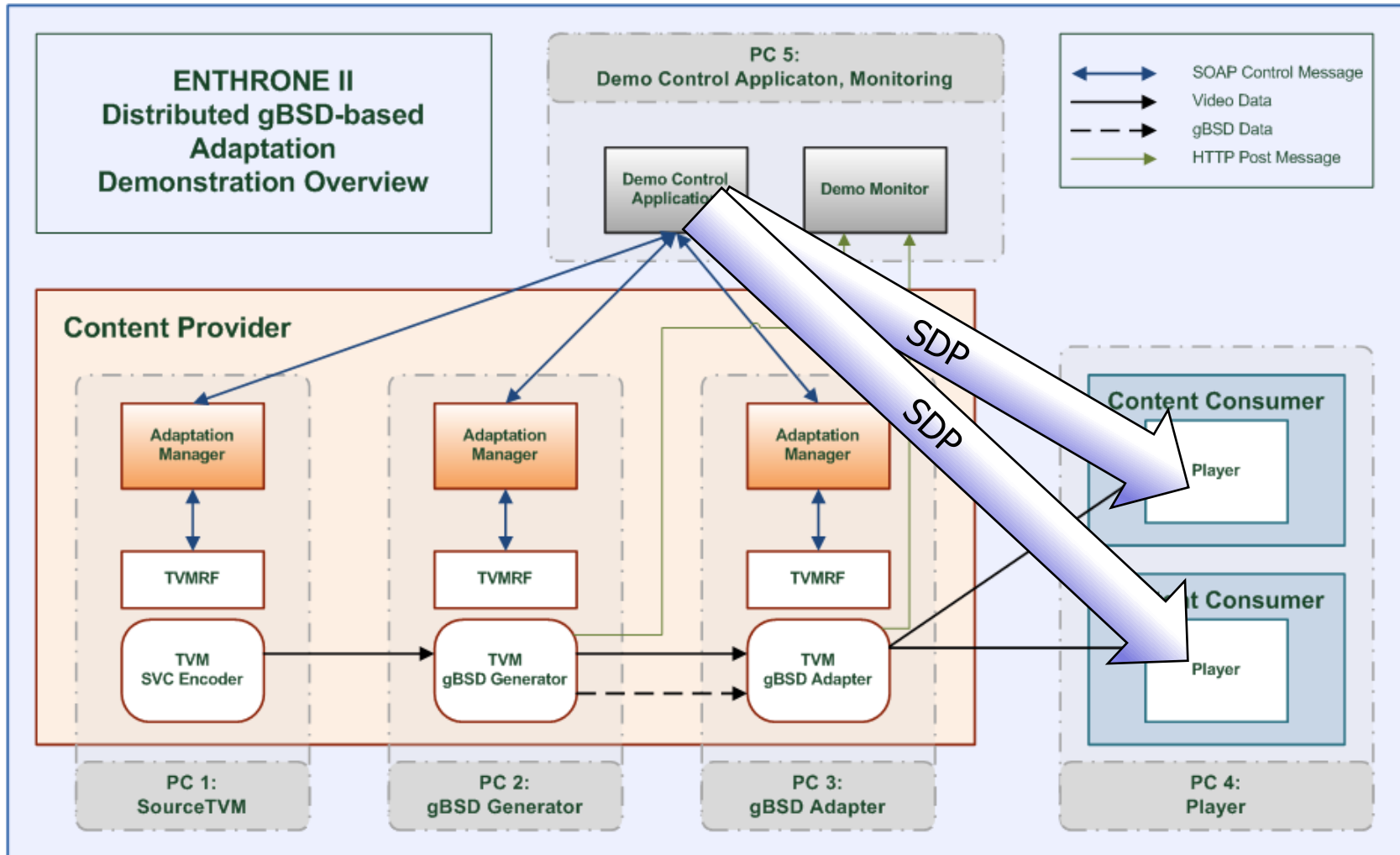
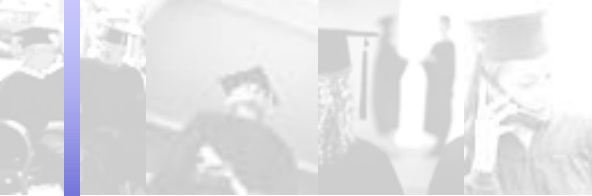


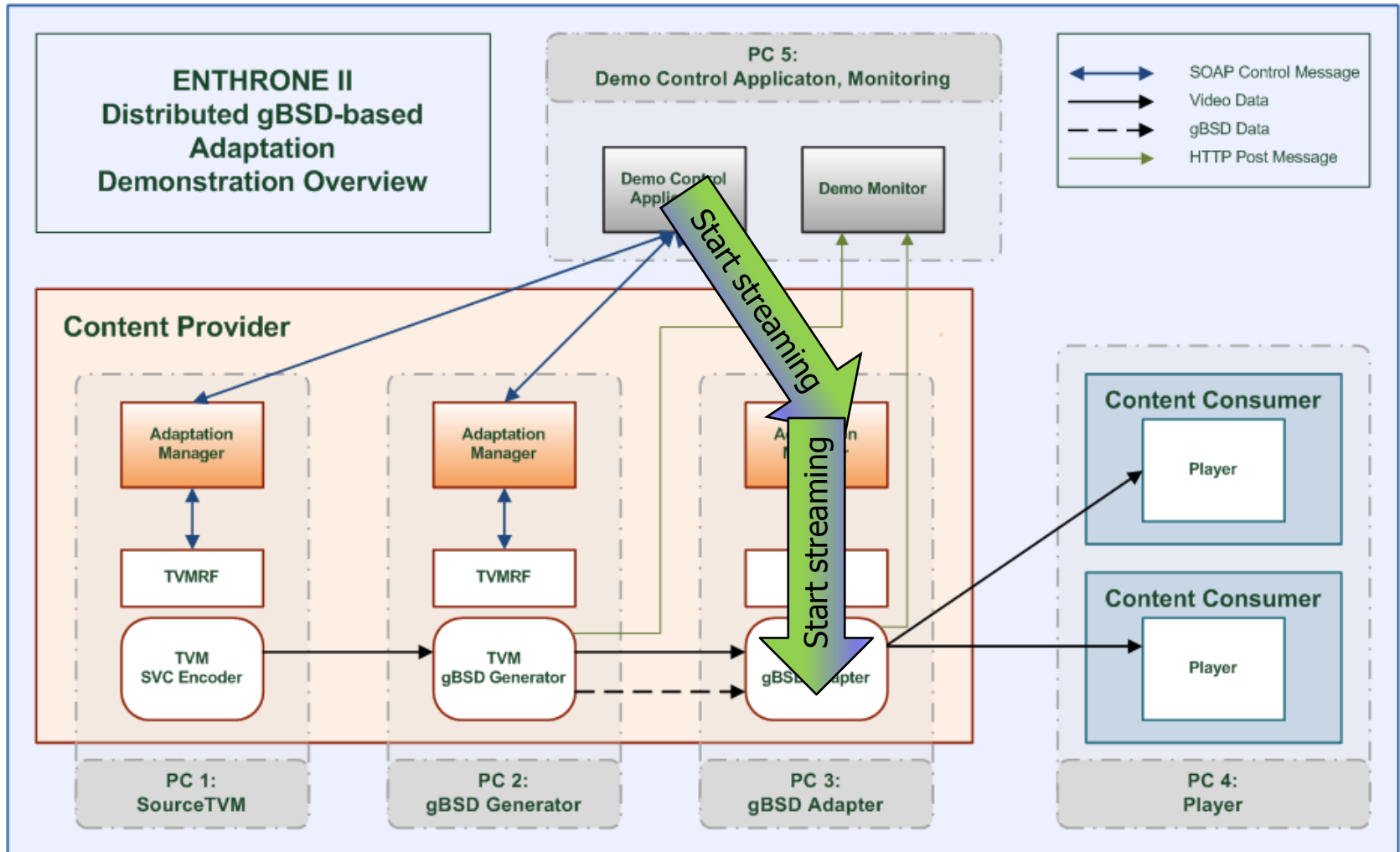


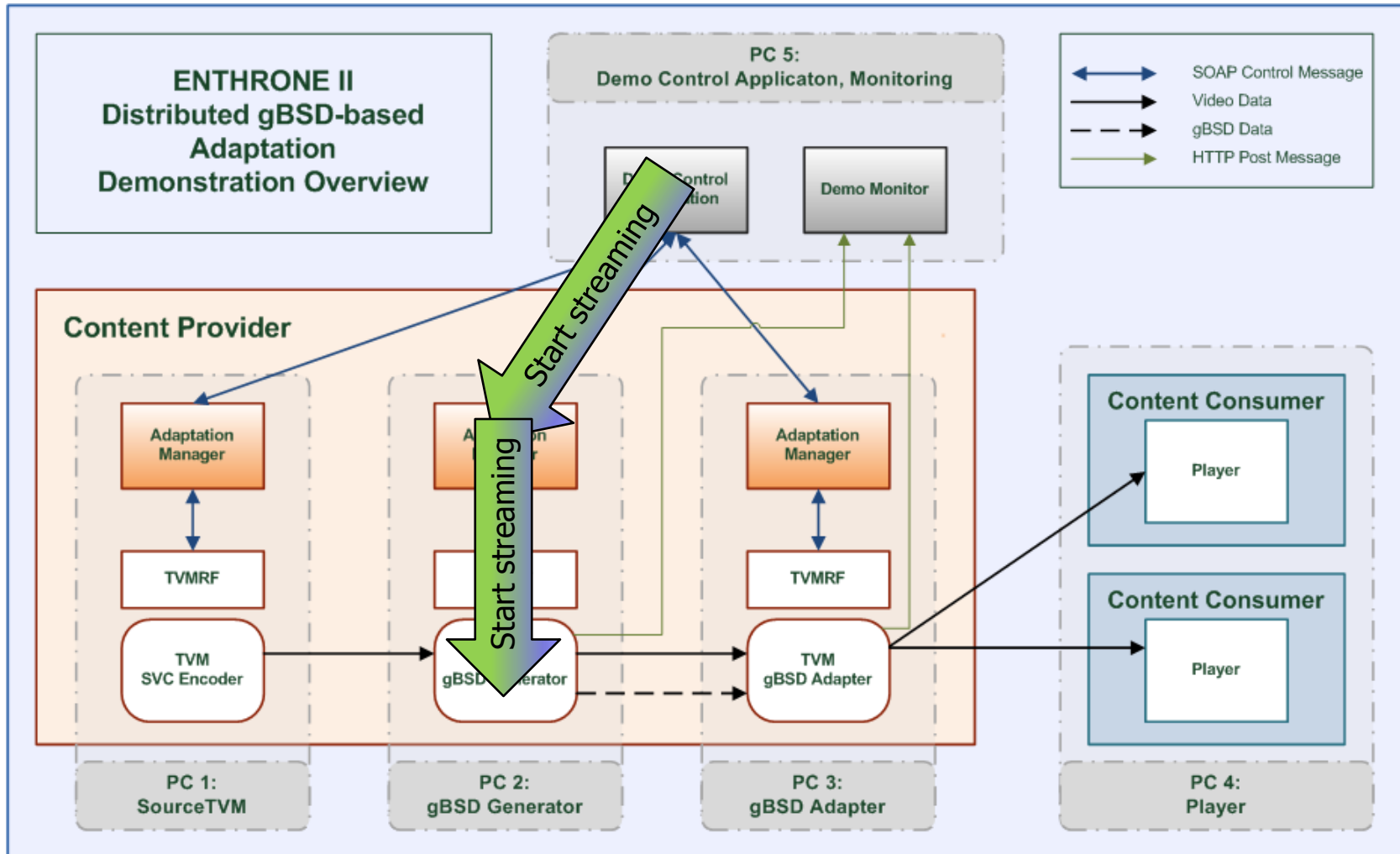


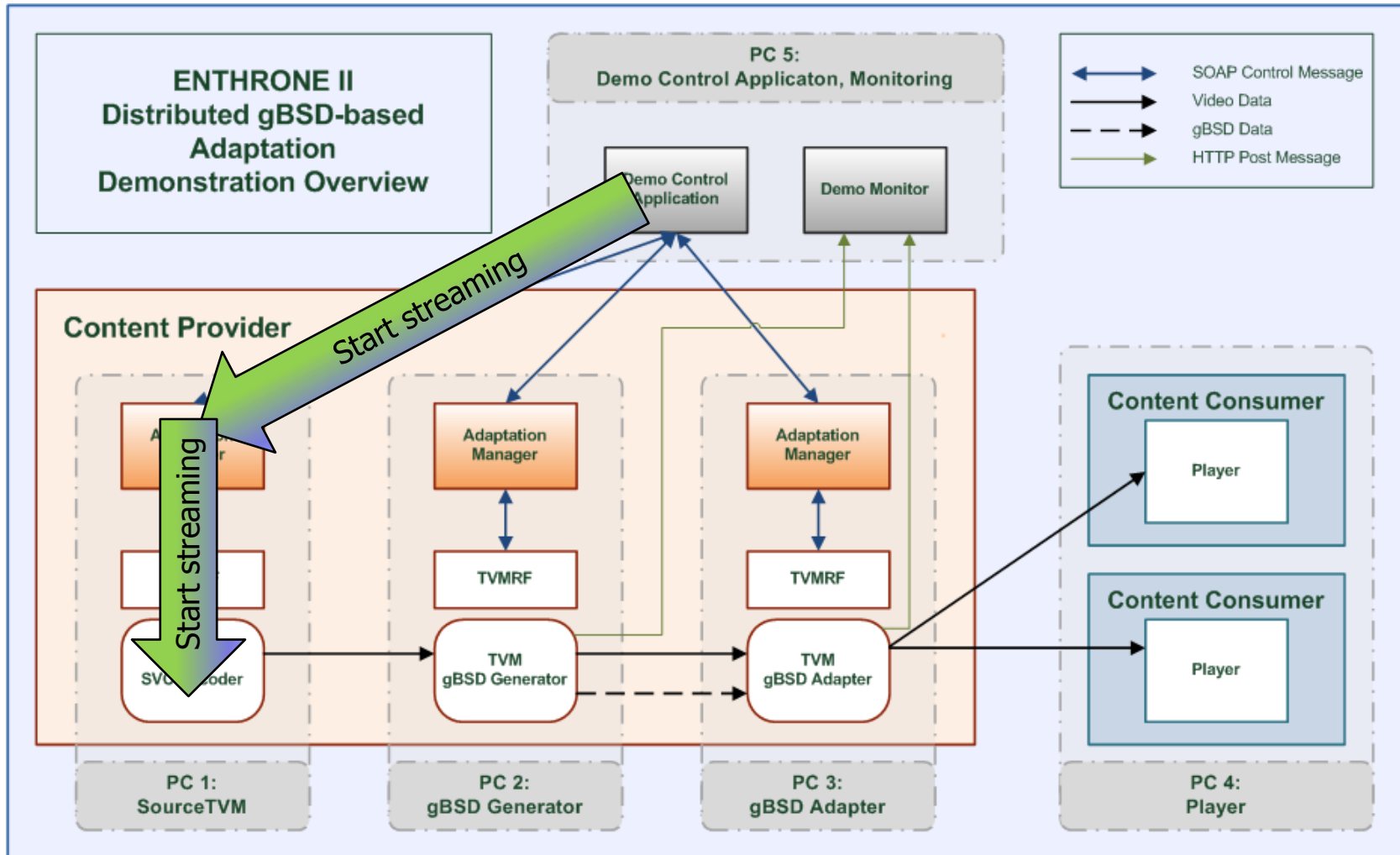


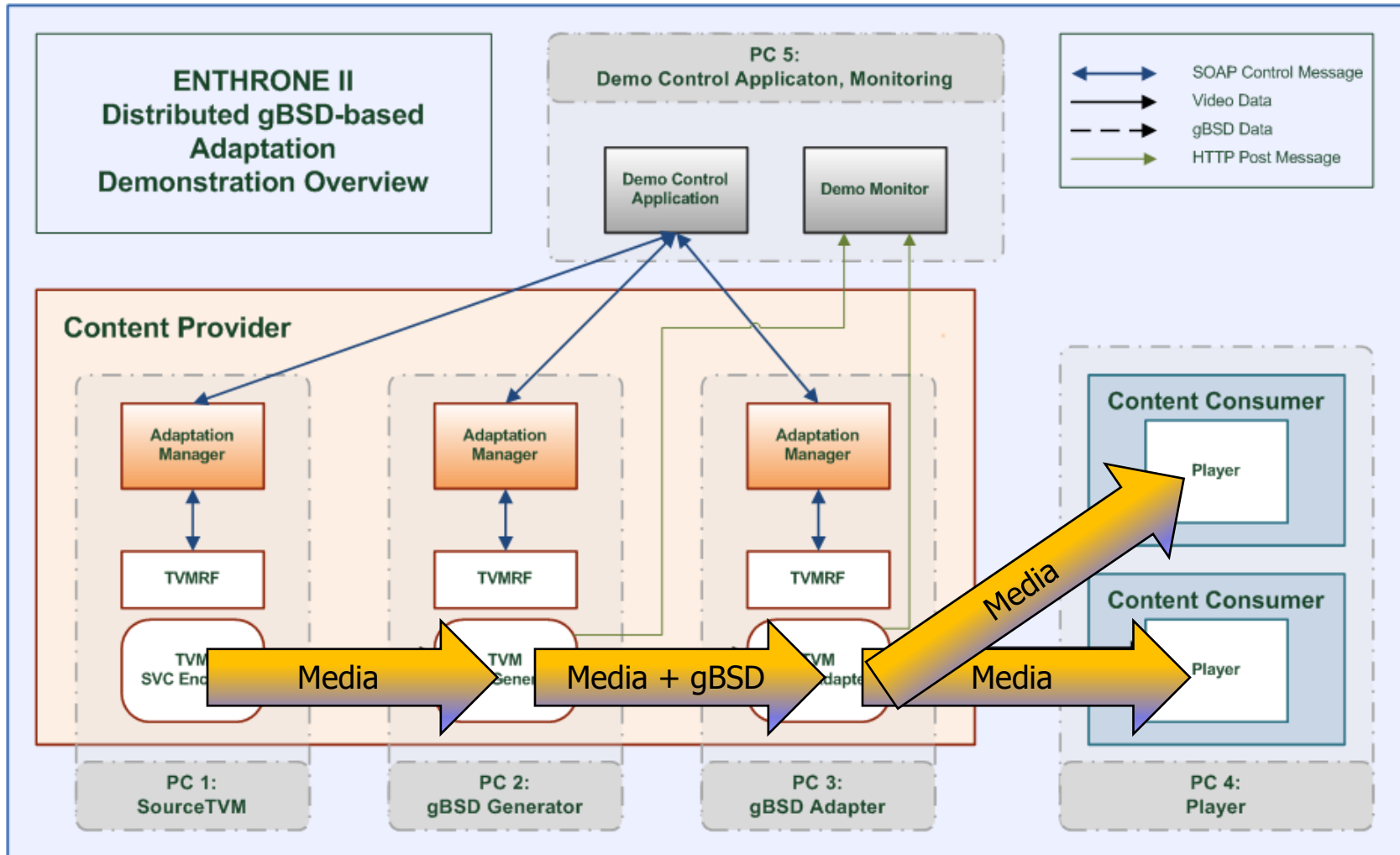






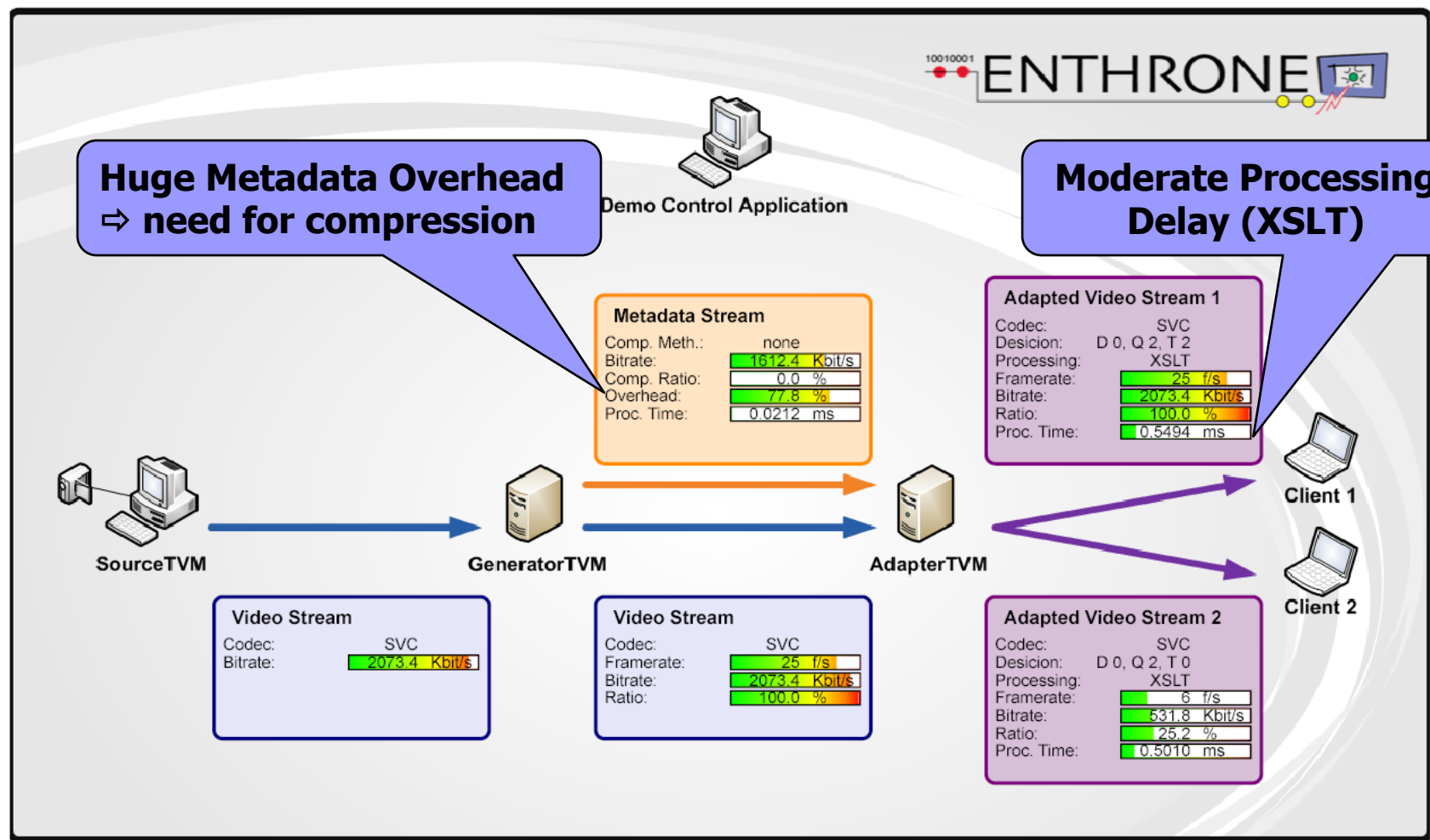




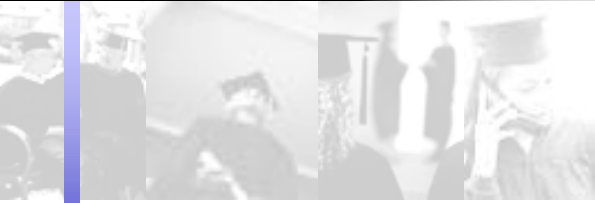




## Demo Monitor 1 – Plain XML, XSLT Transformation







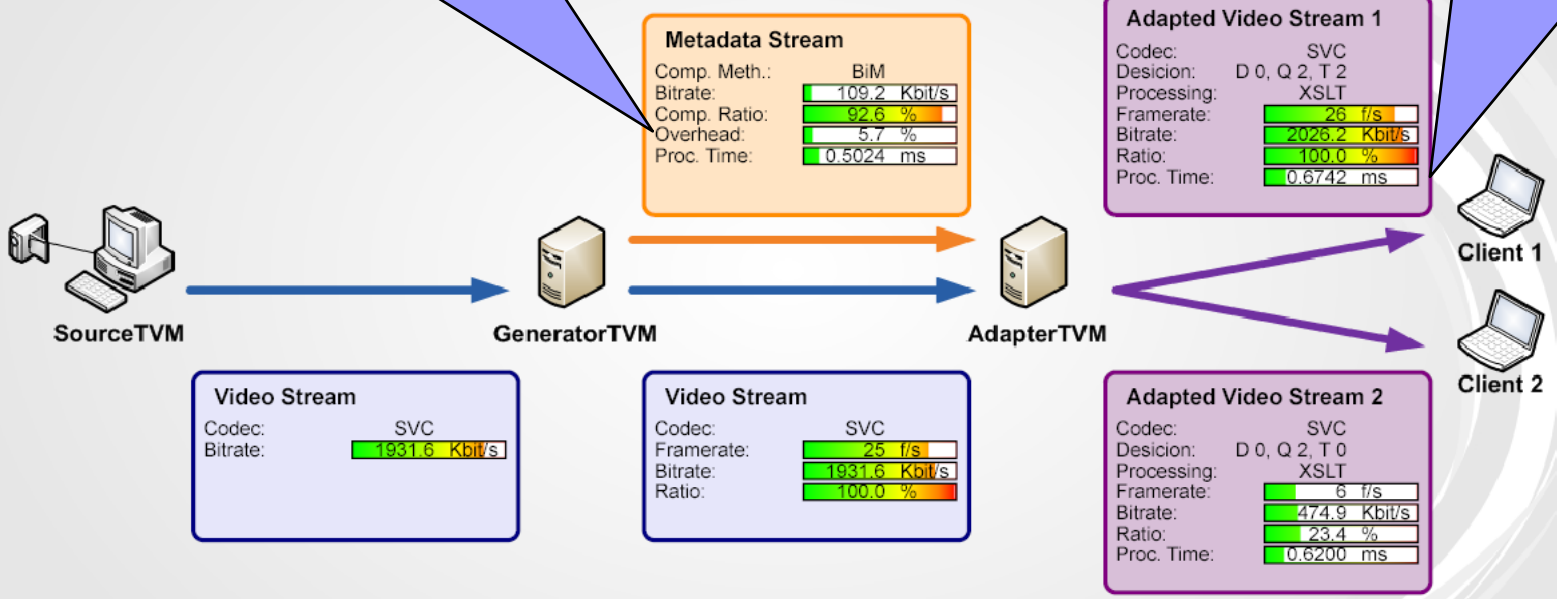
## Demo Monitor 2 – BiM Compression, XSLT Transformation

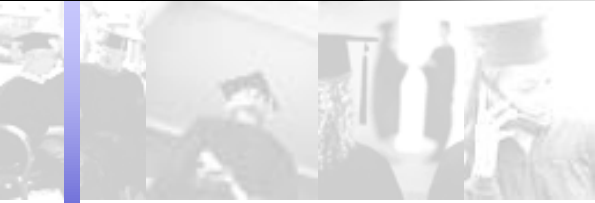


**Small Metadata Overhead due to usage of MPEG BiM**

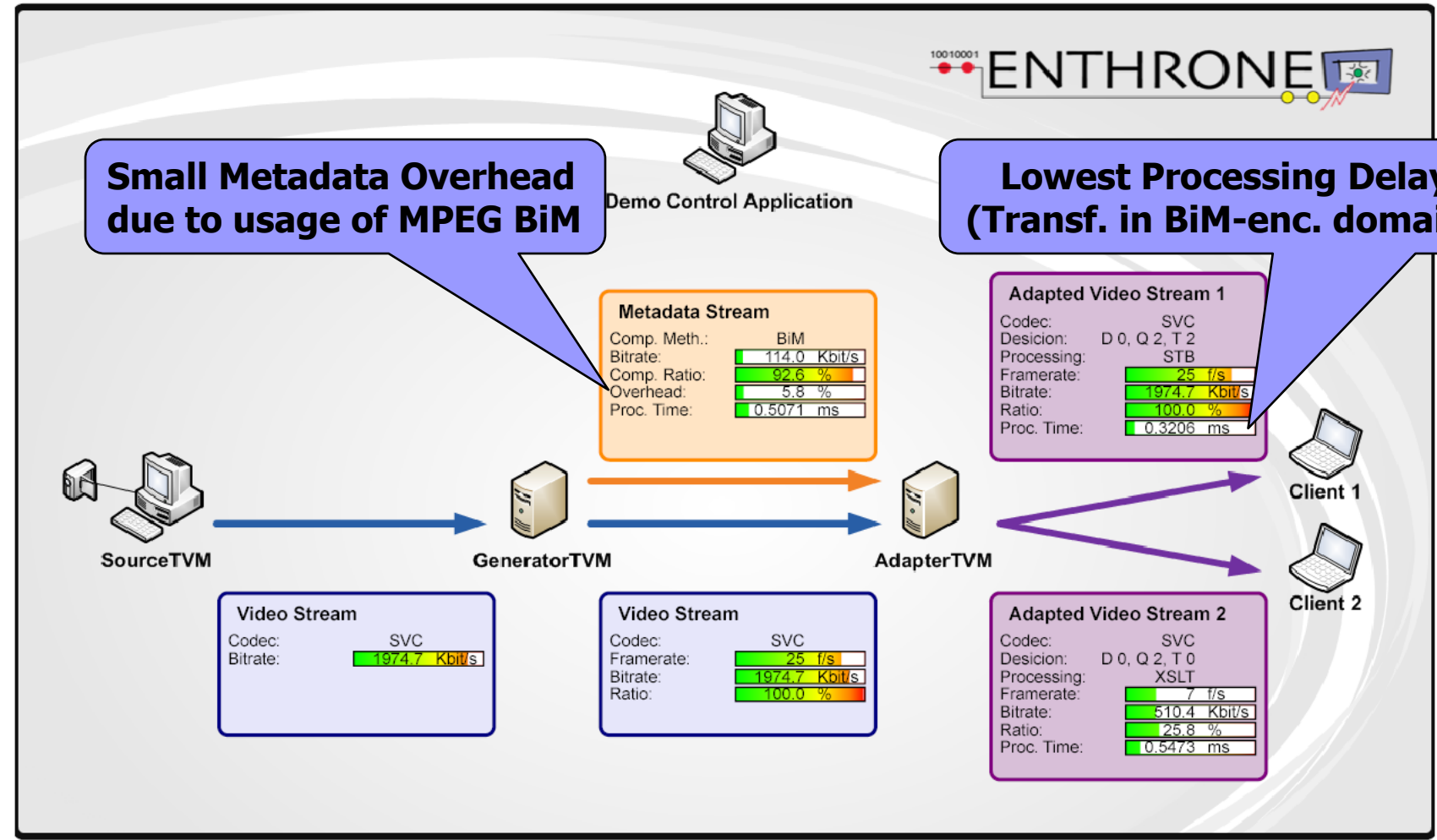


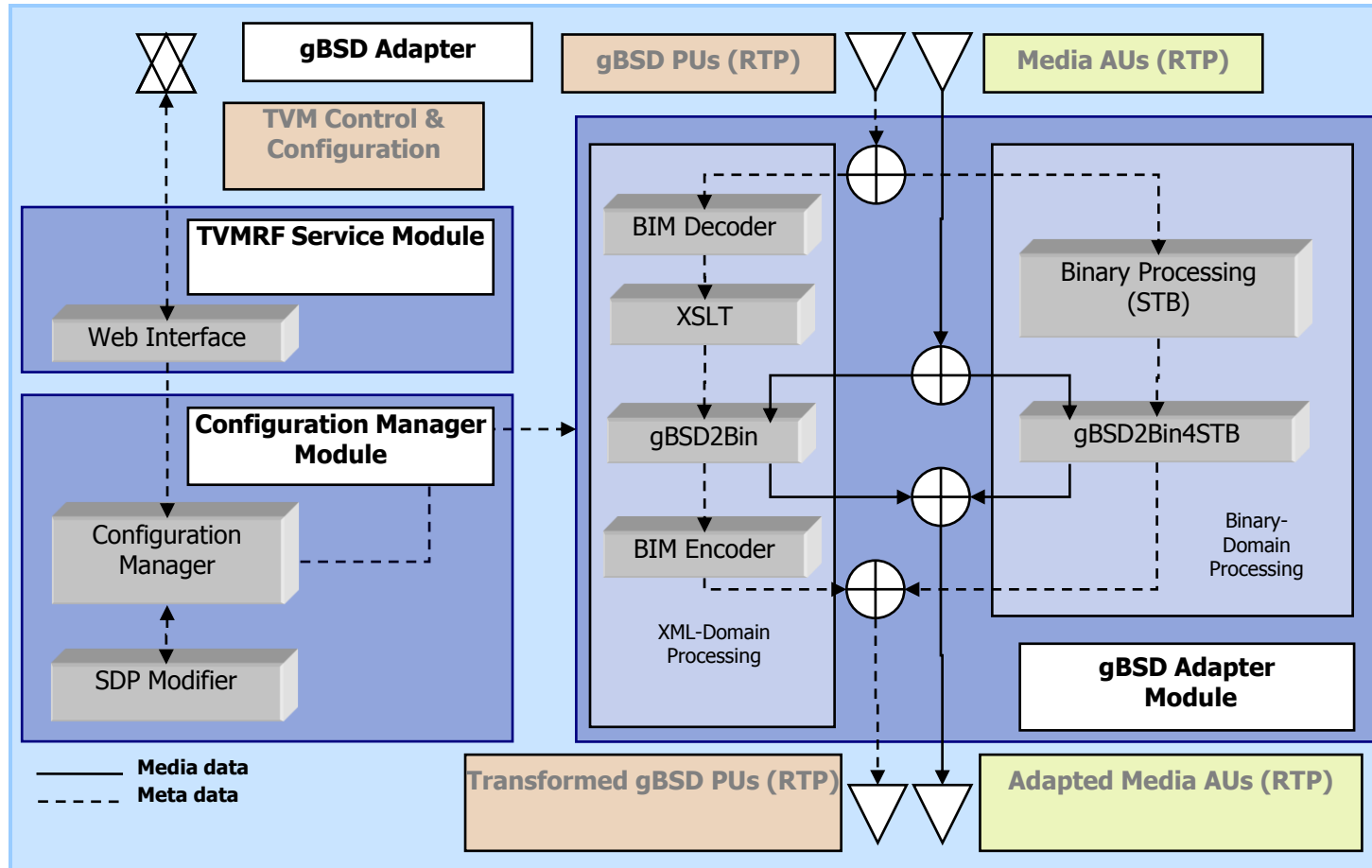
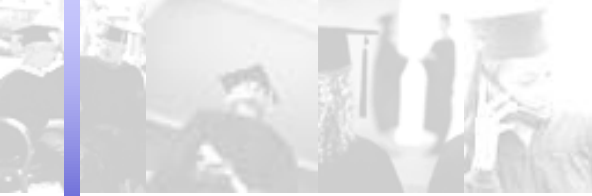
**Higher Processing Delay (BiM decoding + XSLT)**





## Demo Monitor 3 – BiM Compression, STB Transformation







# Outlook

- **Integration of other ENTHRONE components (Terminal Device Manager, Customer Service Manager, ...)**
- **Implementation of advanced RTP payload mode (Non-interleaved mode)**
- **Aggregated gBSD descriptions (access unit level)**
- **Adaptation in other scalability dimensions (spatial, ...)**
- **Detailed performance evaluation of binary processing**



# Thank you for your attention!

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