The Problem

- To develop a proof of concept of how DDS can improve the distribution of audio and video data
- What QoS should apply?

Requirements

- Adaptable bandwidth usage via DDS QoS policies
- Automatic discovery via Builtin Topics
- Transparent deployment on multiple scenarios
  - IP Webcams
  - Videoconference
  - VoIP
- No codec-architecture dependencies: Topic structure is codec agnostic

Scenario

QoS Policies

Deadline This policy is used for congestion detection. There is congestion when the maximum period in which the application expects to receive new video frames or audio packets is exceeded. If a packet arrives too late or a packet loss occurs, the involved peers control the amount of data delivered to the middleware (reduce frame-rate or change codec). When the congestion is overcome, peers recover the previous state.

Time Based Filtering QoS policy used in video applications to reduce application load when the DataReader Deadline expires.

Lifespan A typical audio/video application is only interested in data with short delay.

Liveliness This QoS policy is used for presence control. We can use to detect that an audio or video participant has join or left the domain.

Ownership/Ownership Strength Used in audio moderation in a multiuser conversation channel. Determined by a global moderator through the Signaling Topic (See Demo).

Presentation Order Ordered access to the stream data. Audio/Video samples should be retrieved in the same order.

Best Effort Audio and Video frames are supposed to be delivered with minimum latency. A minimum loss of multimedia traffic is not relevant.

User Data/Topic Data This policy is used for implement access control to the audio/video rooms. If a participant is not allowed to access to an audio or video topic, he would be ignored during discovering.

Signaling Mechanism

- Best-Effort Communications
- Use of Signaling Topic
- Enable Bandwidth usage reduction techniques by request

Topics

Audio/Video There is one topic for each codec or video framerate/compression used for audio/video transmission. If the communication is Unicast, each subscriber can subscribe to an appropriate topic in order to avoid application or network congestion.

Signaling topic This topic is used to notify the publishers about receiver congestion (only useful in Multicast communication), for audio moderation… DDS is perfectly suitable for delivering reliable signaling messages.

Builtin topics Builtin topics are used to discover remote peers and to implement access control (Chat Room Discovery,...).

Conclusions

- DDS is perfectly suitable for audio/video transmissions in many different scenarios
- Need of traffic shaping mechanisms on Publisher side (reduce bandwidth usage) by QoS