Home Network QoS with UPnP-QoS

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Overview

- Introduction
- UPnP-QoS versions 1 and 2
- UPnP-QoS version 3
- User Management of QoS
- Conclusions
All applications / services need excellent QoS!
UPnP/DLNA Home Networking

- AV Control Point
  - CDS
  - CM
  - IP over 802.x
  - control

- MPEG 2/4, ...
- yet the promise is (prioritized) Best Effort

ITU-T Workshop on “End-to-End QoE/QoS”
Geneva, 14-16 June 2006
UPnP-QoS - goals

QoS vs. QoS Management
- QoS solutions exist or forthcoming: WMM(-SA), 802.1p, ..., but (were) not used
- Applications require QoS Management to use QoS

UPnP-QoS for QoS Management in the home
- Not a new QoS solution
- But managing existing QoS solutions
- For the home network, not the Internet
- 3 UPnP-Service definitions
UPnP-QoS version 1 and 2
UPnP-QoS version 1 and 2
QosDevice in server sets priority according to policy

QosDevice on path (optionally) polices
UPnP-QoS version 3

**Goals**
- Admission control (End-to-end and device-level)
- Parameterized QoS / Scheduled access
- Improve QoS management by User

**Solution approach**
- Control Point-based *not* per hop
- Discovery of QoS capabilities
  - Network Capability Model
  - Parameter Capability Model
Basically... introduce 1 new action on QosDevice

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1 R = Required, O = Optional, X = Non-standard.

- What to request?

- Where to invoke this action?
UPnP-QoS version 3

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introduce 1 new action on QosDevice

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- What to request?
  - A traffic specification

- Where to invoke this action?
  - Such that resources are not accidentally requested twice...
Models of UPnP-QoS version 3

First step: L2-dependent segmentation of the network

Segment generalizes “per hop” concept, also covering e.g. AVB
Three primary capabilities: Admit, Release, and List

Capabilities can be qualified by segment, link or direction
Models of UPnP-QoS version 3

Supported parameter Set: x, y, z, u, v

Supported parameter Set: x, z, a
**User Management of QoS**

- Admission Control makes Resource limitations explicit
  - More resources are not always the answer

- How to decide which applications may use the resources?
  - Automatic through Policy
    - Impossible to a priori determine *the* policy
  - Manual
    - Potentially annoying to have to much interaction
Solutions known

- Assigned resources remain available (FCFS)
- Bind QoS to application: No resource → No application
- Allow users to override resource assignments
- Avoid users (unintentionally) taking away resources

For further investigation

- Identify alternative resource assignments
- Enable intelligent control points
Conclusions

- Home Networking is based on (traditional) IT-standards and QoS is still a problem.
- Layer 2 technologies (start to) deliver “real” QoS, but applications cannot make use of it.
- User interaction to be minimized, yet user must stay in control and understand limitations.
- UPnP-QoS v3 is the middleware solution of choice for enabling applications to do QoS management while leaving users in control.
Questions?

Thank you,

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