International Telecommunication Union

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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

Home Networking

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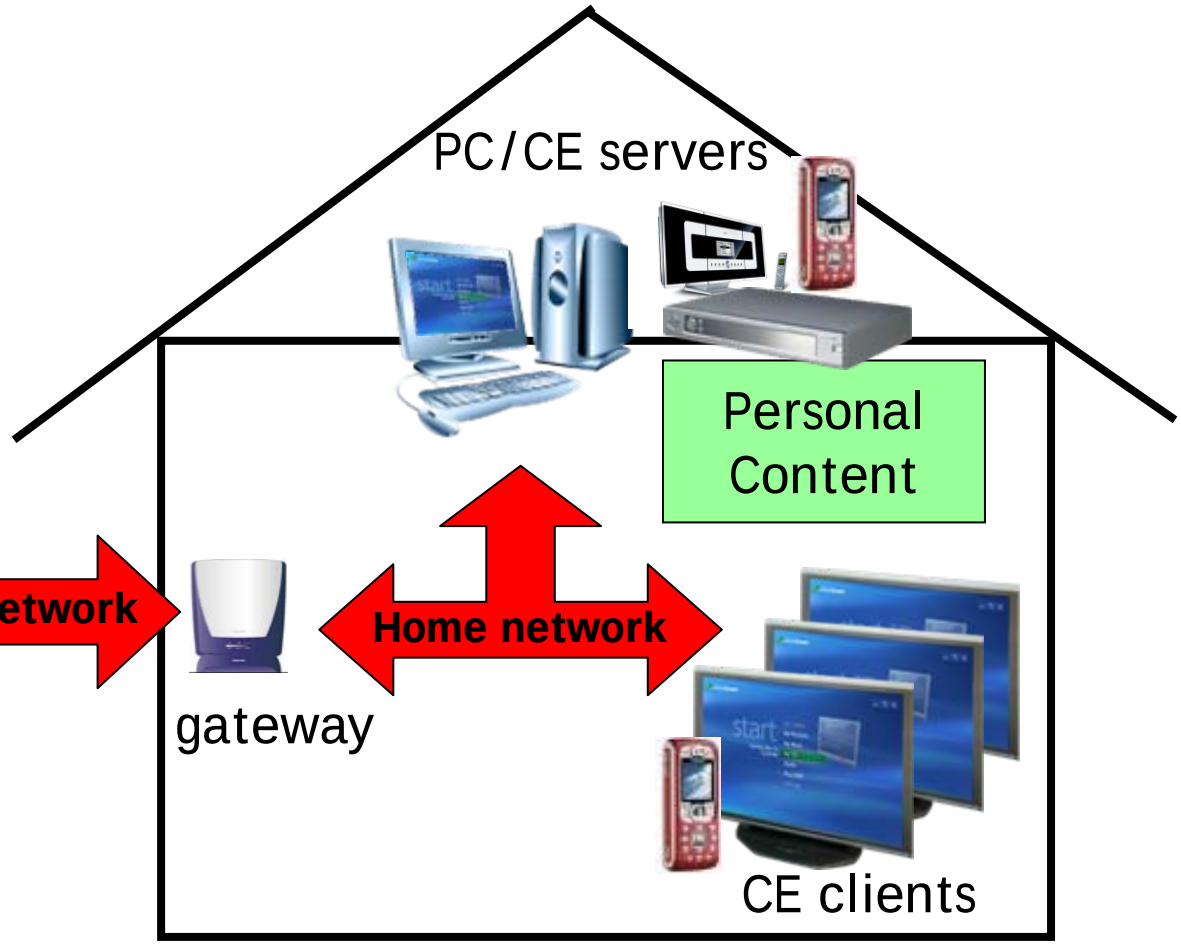
Broadcast content

Internet services

IPTV



All applications / services need excellent QoS!

UPnP/DLNA Home Networking

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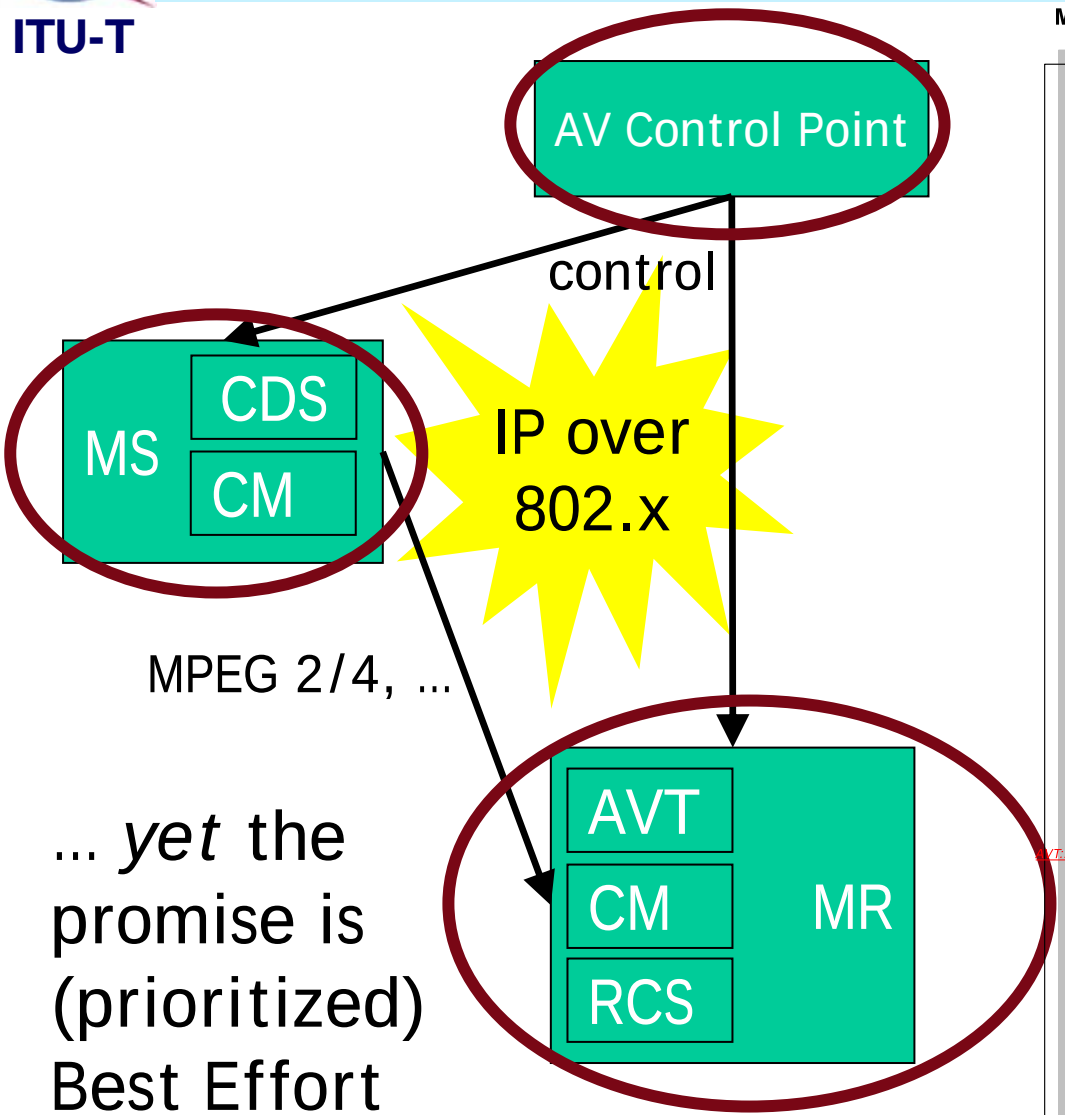
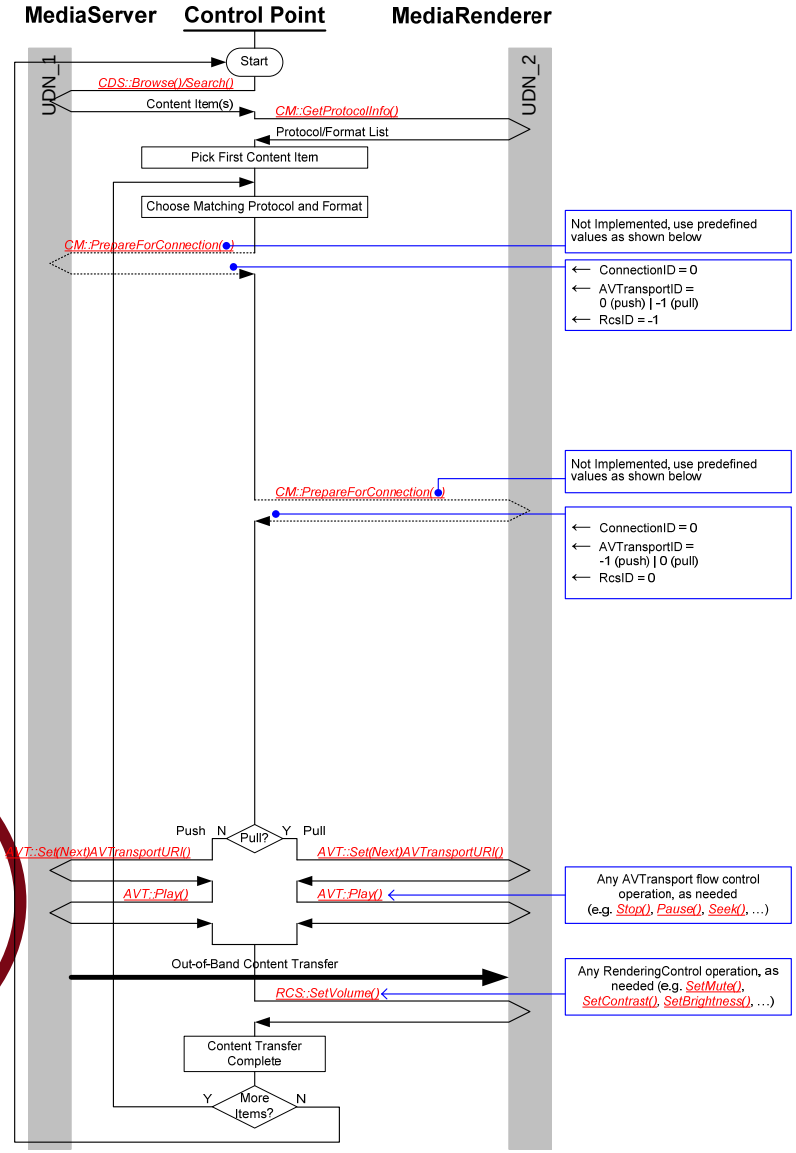


... *yet* the promise is (prioritized) Best Effort



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

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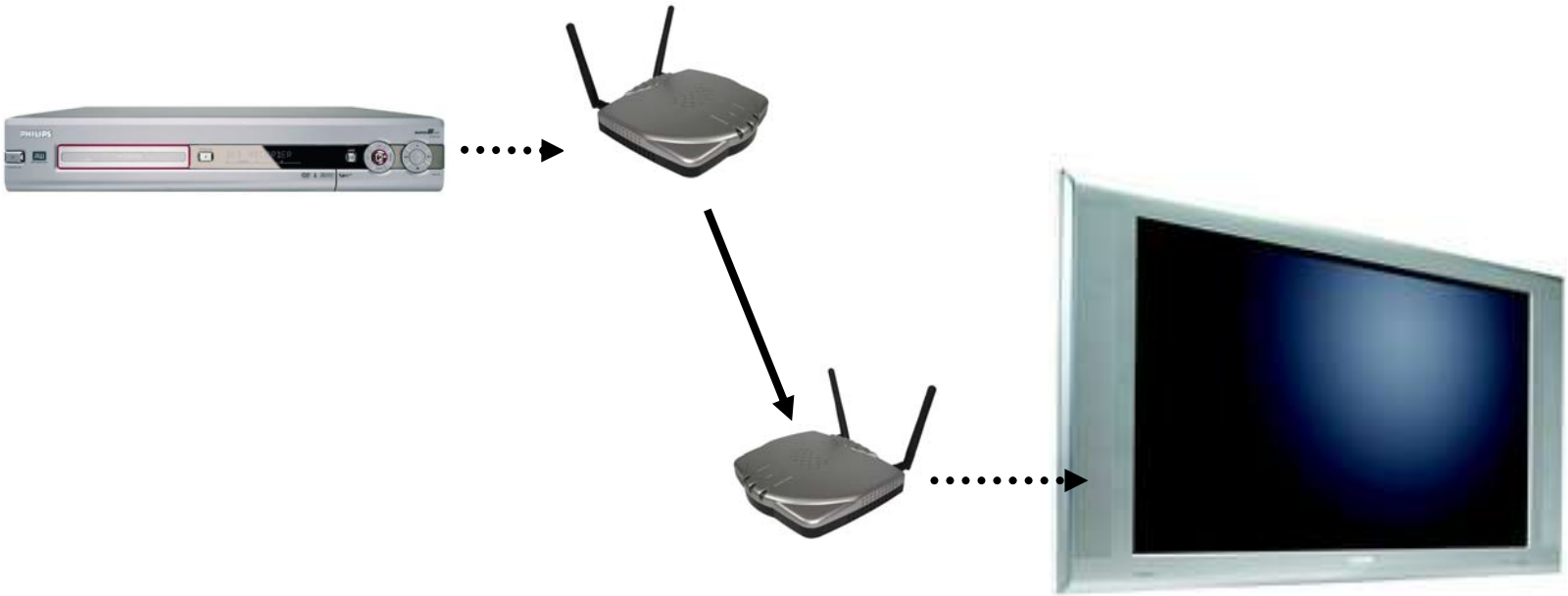
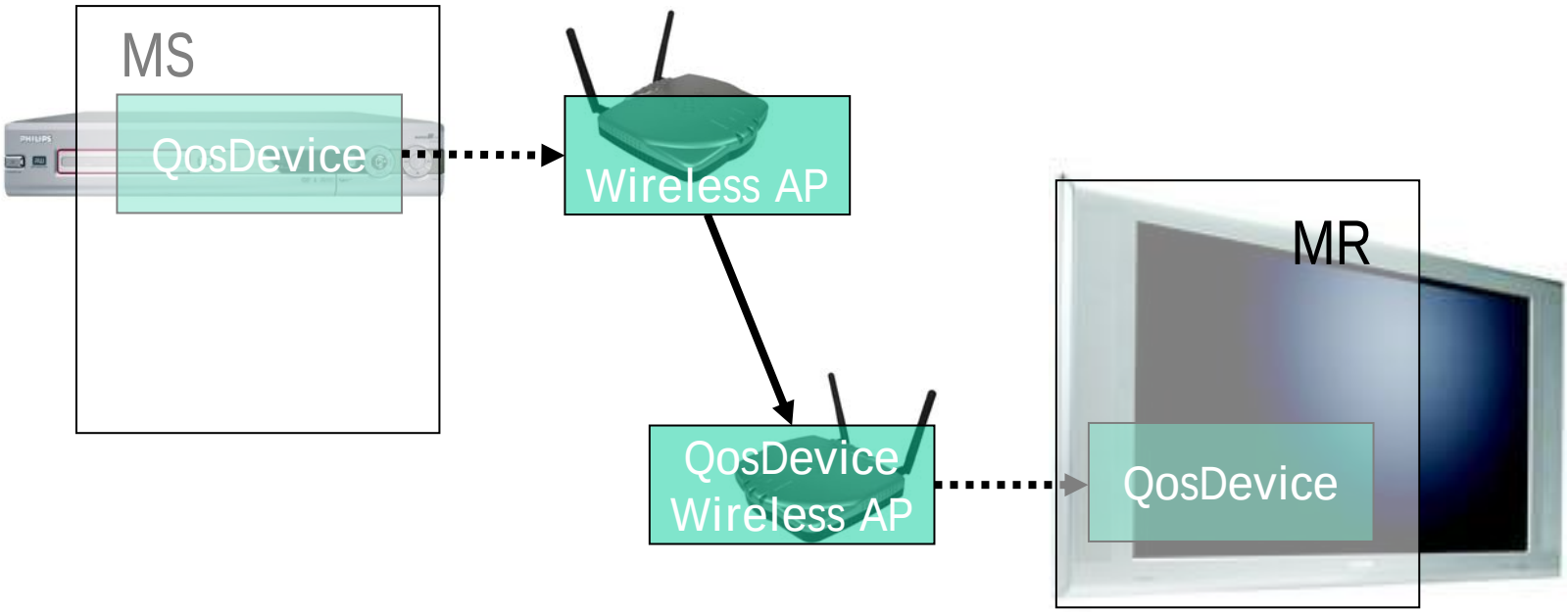
UPnP-QoS version 1 and 2



UPnP-QoS version 1 and 2



UPnP-QoS version 1 and 2

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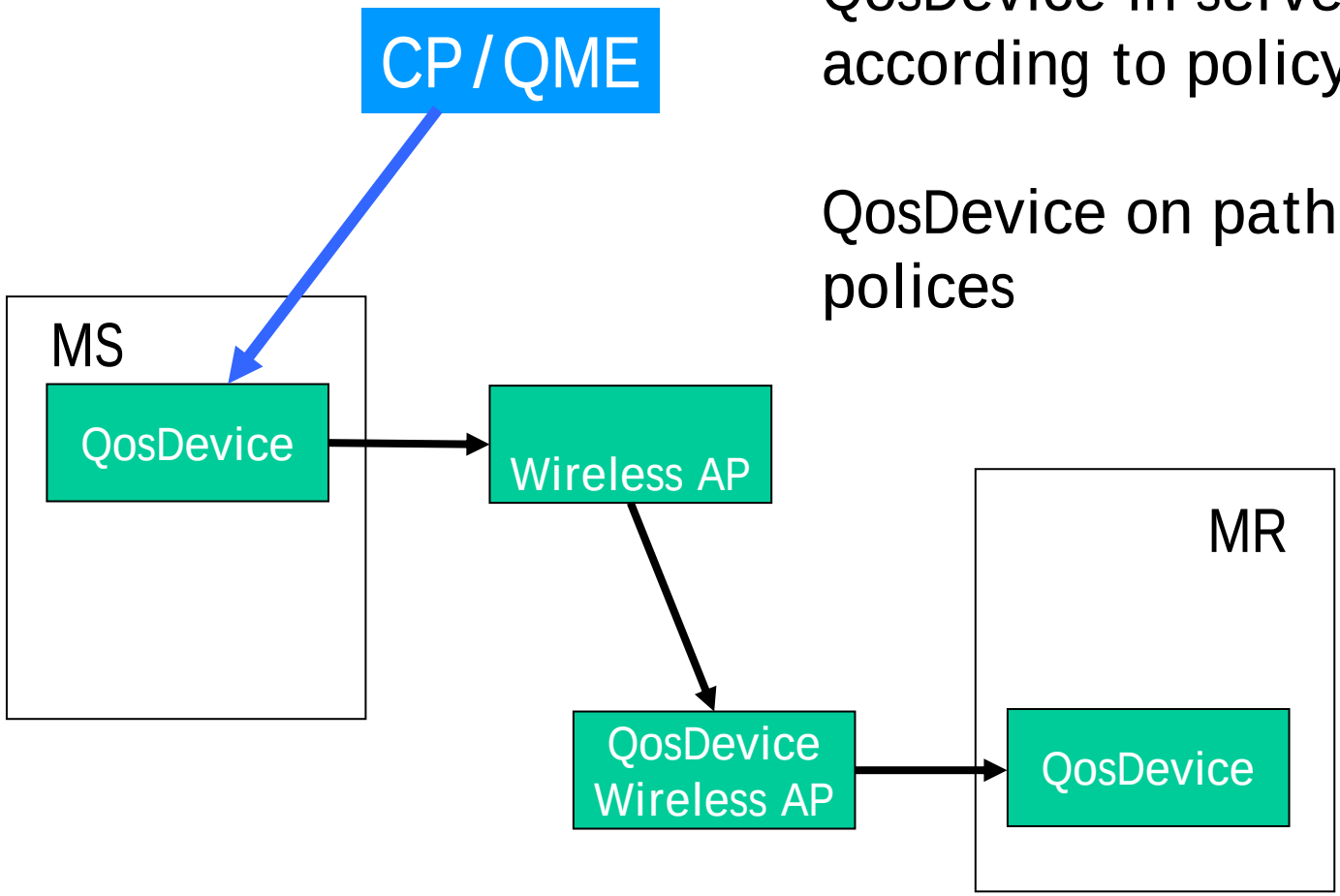
QosDevice in server sets priority according to policy

QosDevice on path (optionally) polices



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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

UPnP-QoS version 3

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Basically…
introduce 1 new action on QosDevice

Name	Req. or Opt. [1]
AdmitTrafficQos	R

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

- What to request?
- Where to invoke this action?

UPnP-QoS version 3

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Basically…
introduce 1 new action on QosDevice

Name	Req. or Opt. [1]
AdmitTrafficQos	R

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

- 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

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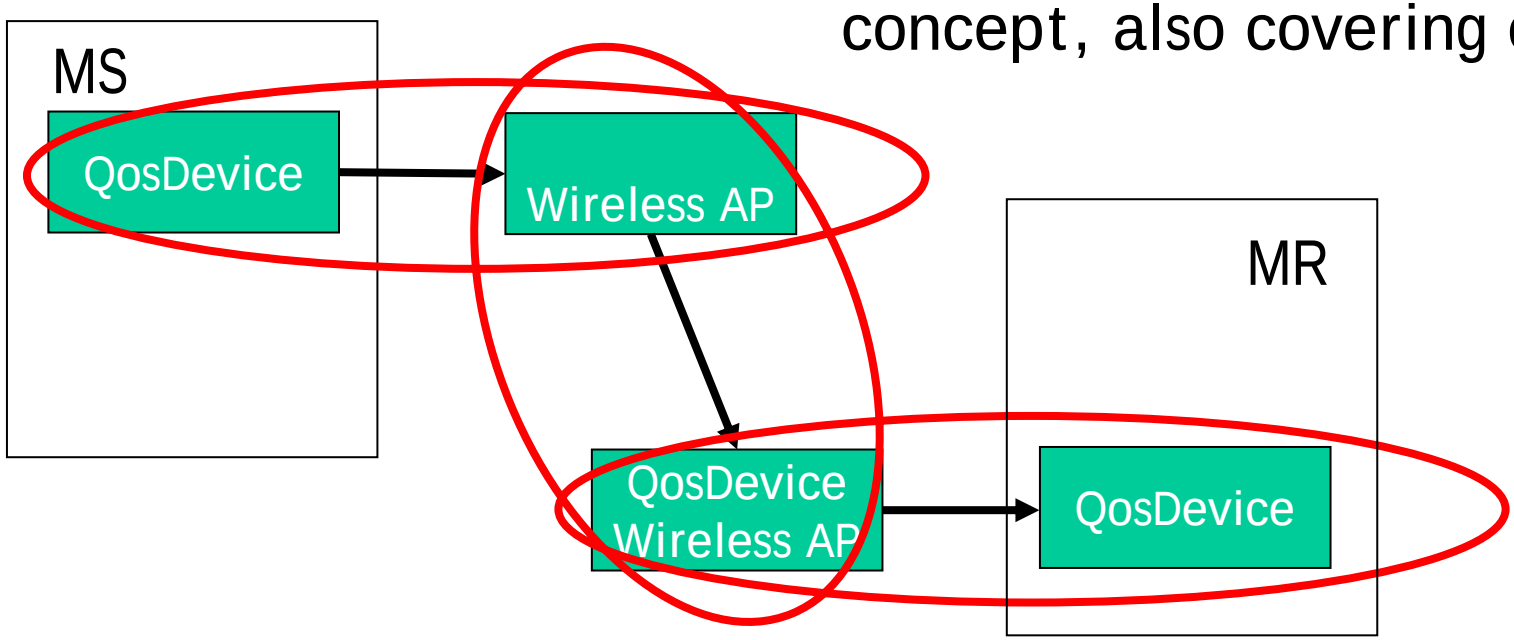
First step: L2-dependent segmentation of the network

Segment generalizes “per hop” concept, also covering e.g. AVB



Models of UPnP-QoS version 3

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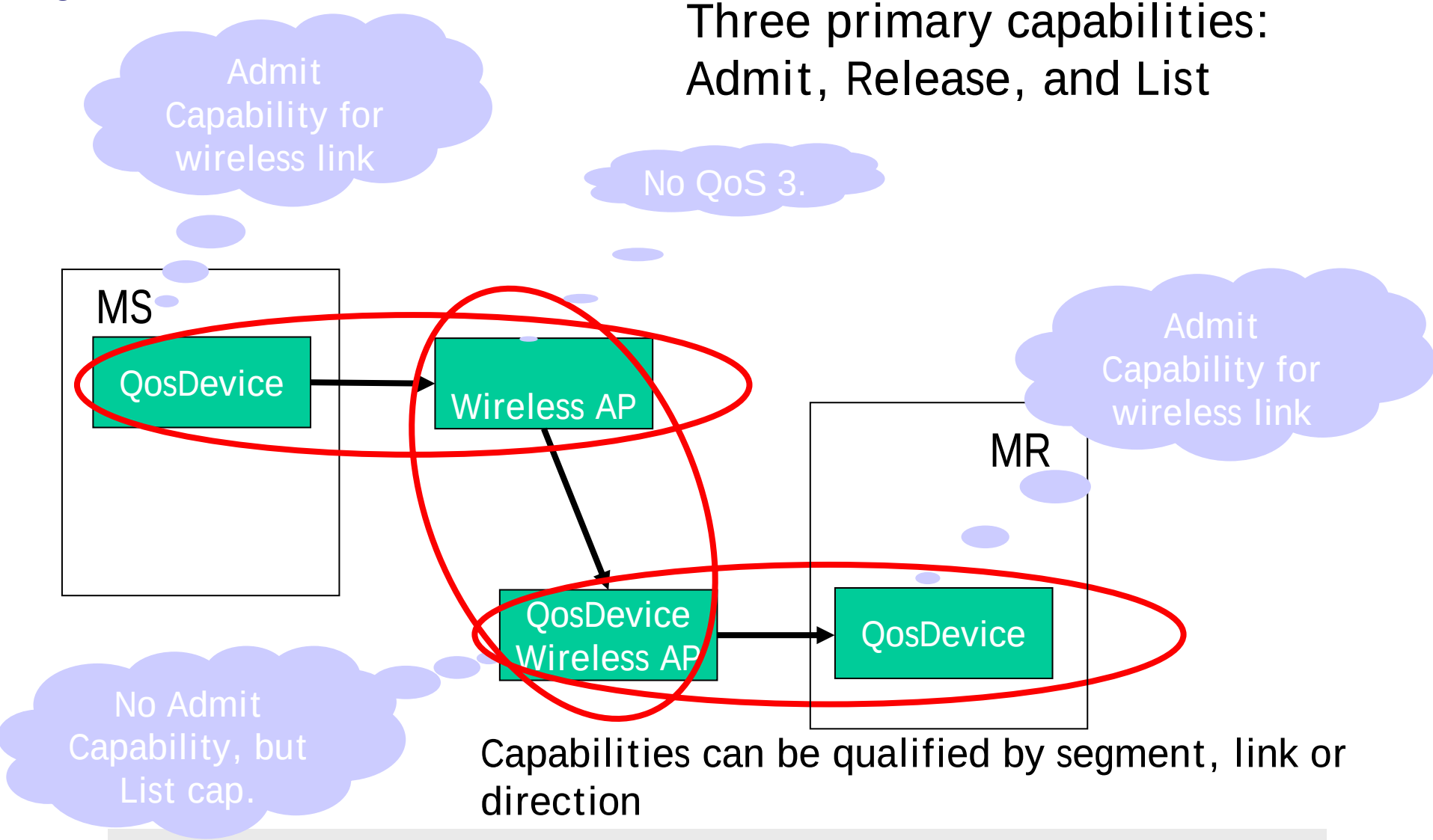
Three primary capabilities: Admit, Release, and List



Capabilities can be qualified by segment, link or direction

Models of UPnP-QoS version 3

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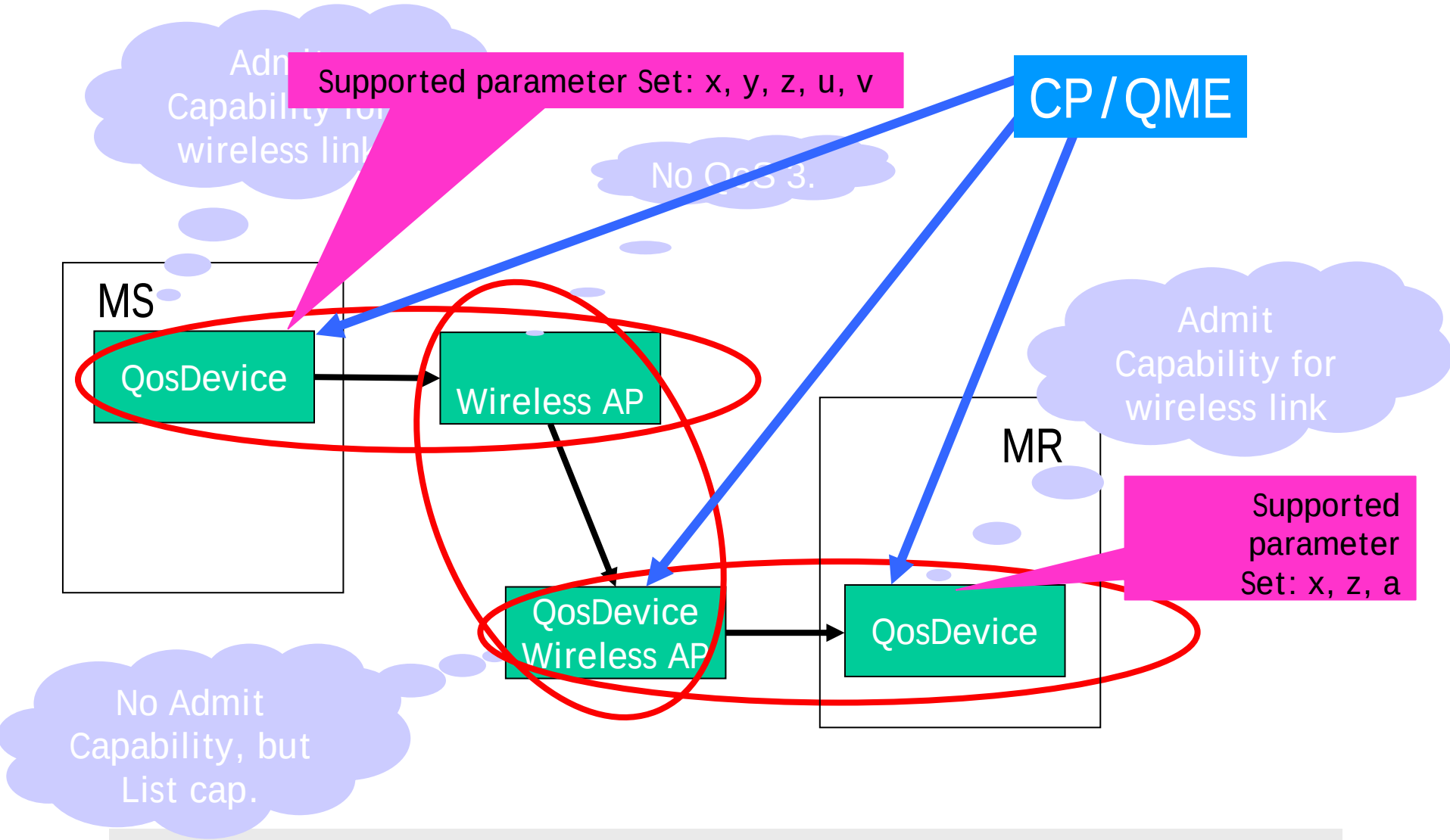

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User Management of QoS

- 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

Tech Req'mnts for User QoS Mgmt

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- 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

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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

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Questions?

Thank you,

Questions?