Dynamic Bandwidth Reservation at Audio Video Bridging

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Needs of Dynamic Bandwidth Reservation

❑ DLNAv2 (Use case 2.4 QoS clusters)

Use Case #	Title	Description
QoS Cluster 3 (4 scenarios)	Availability of QoS Information	The network resource availability is constantly changing, especially with the existence of dynamic wireless segments. A number of use cases that aim to provide predictable user experience require information regarding network state to make consistent and meaningful decisions. This cluster describes scenarios where **traffic streams adapt to changing network conditions or require user intervention when there is a degradation in network resource availability**
Title	**Summarized User Experience**	
End-user control over stream admission and quality 2	John is attending meetings. So he decided to record the SuperBowl on the PVR. His daughter Jill is looking at a soap in her bedroom. Then mother Sue wants to watch CSI in the digital living on a high definition tv. The system replies with a message: "Your network currently cannot maintain playback of this program at this quality since a recording is scheduled. Please choose: (1) Continue anyways, inform me again when the resource conflict occurs (2) Playback of CSI in normal TV resolution instead, (3) Cancel playback of CSI". Sue decides for option (1). 10 minutes later the SuperBowl starts and the PVR wants to record the game. Sue gets a message from the system: "Your network currently cannot continue playback of this program at this quality as a recording is started. Please choose: (1) Reduce quality of CSI to normal TV resolution (2) Cancel playback of CSI (3) Stop the recording. **Sue decides for (1) to reduce her quality to ensure that the recording has sufficient quality**	

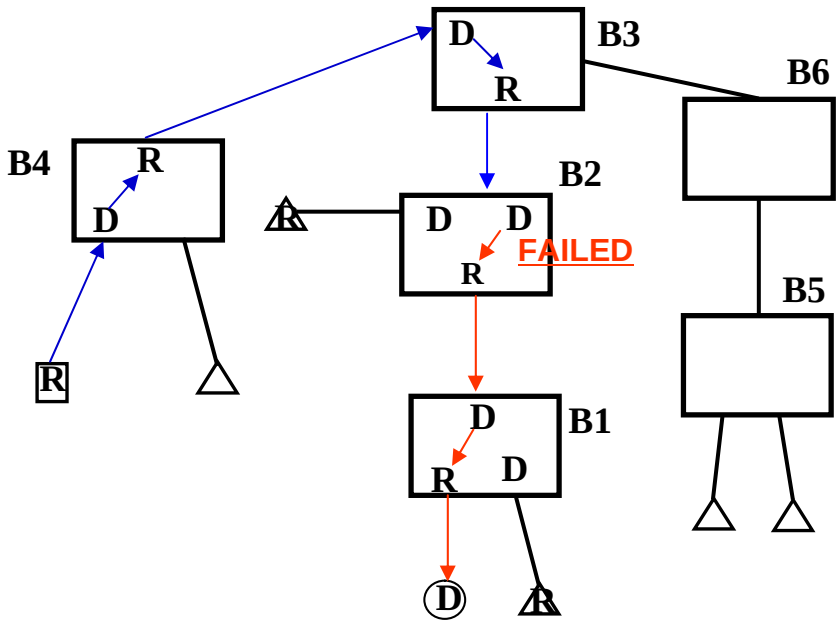
(Ref. DLNAv2_Usage_Scenario_priority_voting_summaryr2 – techtf analysis.xls at www.dlna.org**)**

❑ UPnP QoS 3

- PeakDataRate
- MeanDateRate

Reference Model

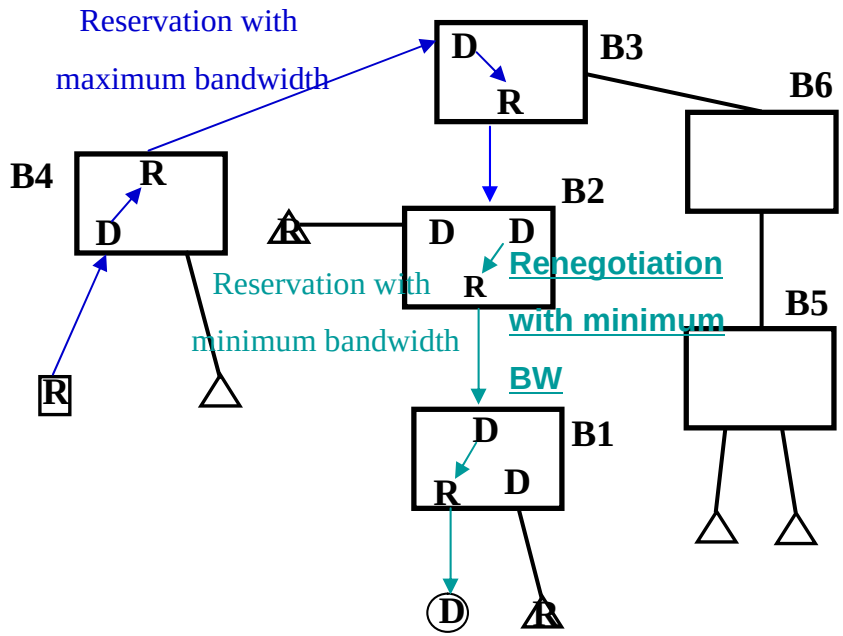
Fixed Bandwidth Reservation



RESV with a "SUCCEEDED" SI

RESV with a "FAILED" SI

Dynamic Bandwidth Reservation



RESV with a "SUCEEDED" SI

RESV with a "MINIMUM" SI

- **Purpose: Increase possibility to provide service for users**
- **Assumption: Talker knows BW requirements of listeners through higher layer such as UPnP**

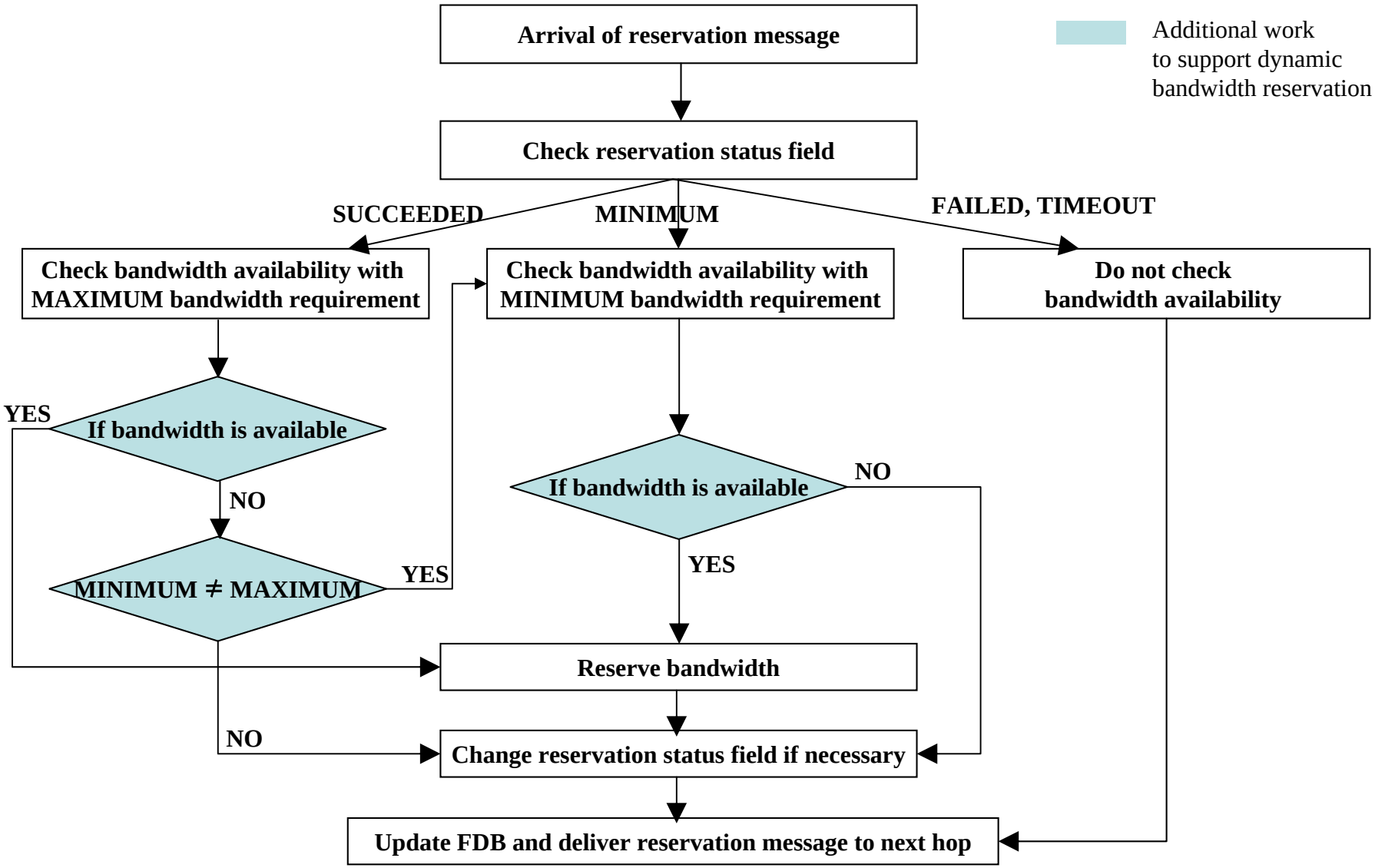
Work of .1Qat

- Reservation field addition
  - Double resource requirement field (Min, Max)
  - “MINIMUM” reservation status field

	Octet
Stream Identifier	1-6
Resource Requirement (Min, Max)	7-14
Talker MAC	15-20
Reservation Status (with MINIMUM)	x-x

Figure 1. Suggesting Reservation Message Structure

Work of .1Qav



Cf. Having identical value for MINIMUM and MAXIMUM means reservation request of fixed bandwidth

Considerable Extension (optional)

❑ Suggestion

- Take resource of other streams, not by preemption but by agreement
  - ◆ If there is a stream getting service and agreeing downgraded service quality in advance, bridges are able to take the resource for new streams

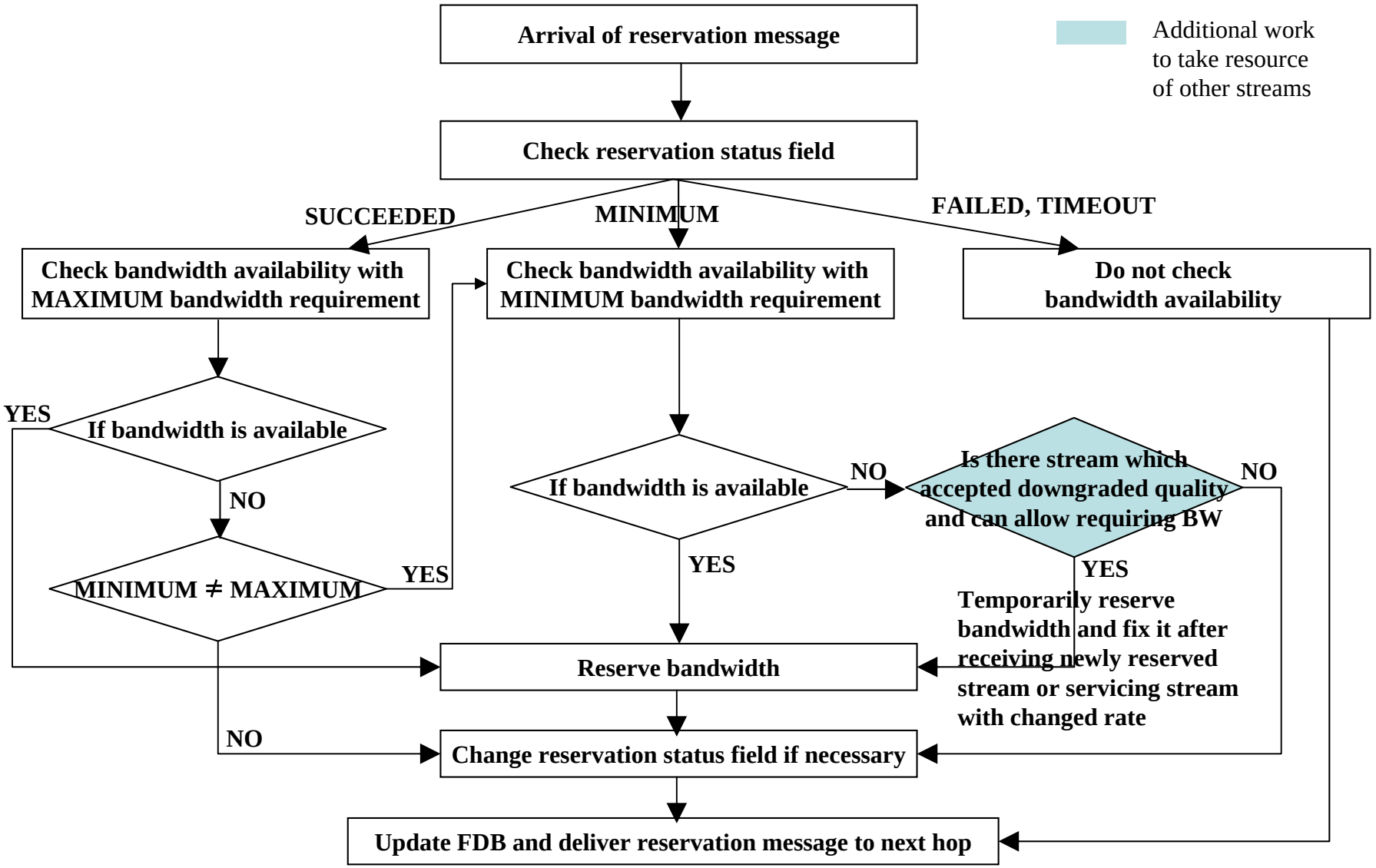
❑ Purpose

- In order to not drop new stream reservation request by degrading quality of servicing application

❑ Extended part

- Look for stream which accepted downgraded quality
- FDB should contain minimum and maximum bandwidth request per stream
- Temporarily reserve bandwidth and fix it after receiving newly reserved stream or servicing stream with changed rate

Work of .1Qav



Cf. Talker degrades quality of agreed stream which gave BW for new reservation request AFTER getting final response from listener

Dynamic Bandwidth Reservation

- Use cases to manipulate suggested fields
  - Dynamic BW request: request BW with different MAXIMUM and MINIMUM values
  - Fixed BW request: request BW with the same MAXIMUM and MINIMUM value
- Applications
  - Applicable to unicast scenarios
  - Partially applicable to multicast scenario
    - When all listeners agree to degrade quality for servicing new streams
    - When only one listener is receiving multicast stream and the listener agree to degrade quality for servicing new streams
- UPnP interoperability
  - UPnP MeanDataRate matches to MINIMUM value of resource requirement of AVB
  - UPnP PeakDateRate matches to MAXIMUM value of resource requirement of AVB

Conclusion

- Needs of dynamic bandwidth reservation from upper layer

- Work of .1Qat
  - Use of min/max resource requirement field
  - Use of a reservation status field, called “MINIMUM”

- Work of .1Qav
  - Check bandwidth availability after confirming reservation status field
  - Bandwidth reservation by result of bandwidth availability confirmation
  - Change reservation status field if necessary

- (Optional) take resources of other streams which agreed to degrade quality of service when bandwidth is not available for new stream reservation
  - One way to increase possibility of stream bandwidth reservation
  - Augment complexity of stream reservation protocol
    - .1Qav: Look for stream which accepted downgraded quality