

STUDY GROUP **16/WP2 Q.13**

Q.12-14/16 Rapporteurs Meeting

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SOURCE*: Nortel Networks

TITLE: Enforcing symmetric operation in the context of slow start for H.323v4

Introduction

H.323v4 includes a new capability to request symmetrical codec operation for fast start. This was based on contribution APC-1607 from the August 1999 Berlin meeting.

It was pointed-out in that contribution that there was a means in slow start to achieve this using the `receiveAndTransmitAudioCapability` and `receiveAndTransmitVideoCapability` in the terminal capability set. This is however to stated very explicitly in H.323: it should be.

Further investigation revealed further problems.

Because of the asymmetrical nature of opening logical channels in slow start, the channels may be opened using the wrong codec.

For example:

- A advertises `receiveAndTransmitAudioCapability` = { G.711, G.729 }
- Simultaneously, B advertises `receiveAndTransmitAudioCapability` = { G.729, G.711 }
- Master/Slave determination result in A=Master, B=Slave
- A opens A→B logical channel using G.729, since B told A that it's preferred codec was G.729 (preferred list)
- Simultaneously, B opens B→A logical channel using G.711, since B told A that it's preferred codec was G.729 (preferred list)
- The first side to open its forward channel will have to reject the other request since it only supports symmetrical codec operation.

The explanation on how to deal with this problem is very well hidden in C.4.1.3 on “conflict resolution”. This section describes that when there is a “conflict”, the master is responsible for rejecting the conflicting request to open a logical channel. This section leaves us to believe that a slave shall then re-attempt opening the channel using a non-conflicting codec. But this is not explicitly stated.

One way to solve the symmetrical codec operation proposal is to adopt the following procedure:

- When symmetrical codec operation is used, the Slave shall order its codec preference in the same order as the Master. This could be in the `receiveAndTransmitAudioCapability` and `receiveAndTransmitVideoCapability` elements if they haven't been already sent. The same should apply when opening the logical channel. Of course, since the process of terminal capability negotiation and opening logical channel is asynchronous, there is a chance that this will not ensure success: the following is thus also necessary:
- When symmetrical codec operation is used, the Master may reject a request from the slave to open a logical channel with a different codec than the one it is already opening. The Master may then send a `requestMode` with the proper codec.

Proposal

It is proposed that the procedures defined above be added to the H.323v3 Implementor's guide and to H.245 and H.323v4.

The following sentence shall be added to sections C.4.1.3/H.245 and C.5.1.3/H.245:

After the request to open a logical channel has been rejected by the master, the slave is responsible for attempting re-opening a non-conflicting channel.

The following paragraph shall be added after the 3rd paragraph in 6.2.8.1/H.323v4:

Receive-and-Transmit capabilities describe the terminal's ability to receive and transmit information streams when these capabilities are not independent and are required to be the same in both directions. For example, an endpoint might support only symmetrical codec operation for its codecs (G.711 both ways, or G.729 both ways, but not G.711 one way or G.729 the other way). A slave should reorder its codec preference in the same order as the Master, e.g., if the slave's preference is {G.729, G.711} and the Master's preference is {G.711, G.729}, the slave should reorder its preference to {G.711, G.729}. If the slave has not already sent its terminal capability set yet, it should send the reordered set. If the terminal capability set has already proceeded, it should consider its preferences as reordered when proceeding to opening logical channels.

The following paragraph shall be added after the 6th paragraph in 6.2.8.1/H.323v4:

When symmetrical codec operation is used (i.e., when the **receiveAndTransmitVideoCapability** or **receiveAndTransmitAudioCapability** was used), the Master may reject an **OpenLogicalChannel** request from the slave if the Master requires the user of symmetrical codecs and the proposed channel is not symmetrical. These conflict resolution procedures are described in H.245/C.4.1.3. The reason field in the **OpenLogicalChannelReject** shall be **masterSlaveConflict**.

Note - The Master may send a **requestMode** to the Slave with the proper codec before sending the **OpenLogicalChannelReject** to explicitly request a specific codec.