Extended Procedures of RTCP Data Transmission in the Videoconference with the Centralized Architecture

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Abstract – **The processes of RTCP data transmission in videoconference applications with the centralized architecture are considered and the problems related with these processes are formulated. The involving of diagnostic node (DN) is proposed for solving the problem of RTCP broadcast traffic reducing.**

Keywords – **Diagnostic Node, Media Server, Receiver Report, RTCP, Videoconference.**

I. Introduction

The videoconference session, which is characterized by high level of data transmission intensity, has two problems to solve. The first problem is that the RTCP traffic cannot exceed 5% of total link channel utilization. Thus, when number of participants of videoconference session is increased or congestion appears, RTP traffic can take away a part of RTCP's bandwidth. It leads to increasing of Receiver Report (RR) interval and, as a consequence, to increasing of response time of videoconference session participants to changed transmission conditions. It means that videoconference session participants will not be able to take action for handling of such situation in good time, and it will lead to deterioration in the quality of data transmission.

The second problem is that according to standard, the feedbacks from all session participants have the equal weight and, therefore, the equal RR interval. Such approach doesn't allow using RTCP's bandwidth effectively, because the relevance of session participants can be inhomogeneous. It leads to that the hosts of session participants, whose state corresponds to a stable good, will transmit RRs, which will be redundant from this point of view. And hosts, whose state is critical and needs increased surveillance, will not be able to obtain it and hence, the feedback would work for them inefficiently.

So, the tasks of broadcast traffic reducing and RTCP traffic differentiating with purpose of increasing efficiency of feedback processes in the videoconference session are rather actual and will be considered in this article.

II. The Diagnostic Node Involving to the RTCP Feedback Model

According to [1,2], the monitor service can be involved to the RTCP processes without taking part in RTP traffic transmission. Here, the diagnostic node is proposed as a monitor service, which collects and analyses statistics of RTCP-reports to estimate videoconference channels' state.

The diagnostic node can be realized as an additional service on a videoconference's control unit. As it can be seen on the Figure 1, the diagnostic node receives the RRs' statistics from all multimedia session participants by unicast way, analyses it and sends the analysis results in the RSI (Receiver Summary Information) packet to the current media server, also by unicast way. Then, the RSI and SR (Server Report) packets are sent by the current media server in a broadcast form.

The broadcasting ratio of standard RTCP feedback to the proposed RTCP feedback model without taking into account the size of packets will contain:

$$\frac{[(n-m)\times(n-1)]_{RR}+[m\times(n-1)]_{SR}}{[n]_{RR}+[m\times(n-1)]_{SR}+[m\times(n-1)]_{RSI}}=\frac{n^2-n}{n+2mn-2m}, \quad (1)$$

where n – is a total number of multimedia session participants, m – is a number of media servers (or Senders). Here, m=1, because there is the only one media server at any moment in videoconference session with the centralized architecture. So, the result of the equation (1) can be represented as:

$$\frac{n^2-n}{n+2mn-2m}=\frac{n^2-n}{3n-2}. \quad (2)$$

From here we can see that the proposed RTCP feedback model with involved diagnostic node obtains linear characteristic that says about reducing broadcast traffic. Here, DN – is the Diagnostic Node, MS – is the Media Server, SP1..SPn – are Session Participants, RR – Receiver Report.

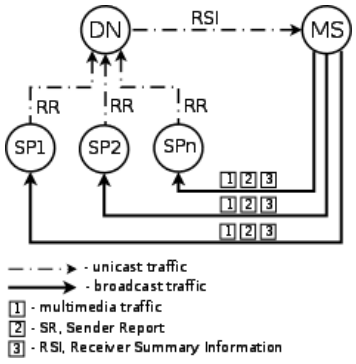

Fig.1. The RTCP feedback with the diagnostic mode

III. Conclusion

In this paper the processes of RTCP data transmission in videoconference applications with the centralized architecture are considered and the problems related with these processes are formulated. The involving of diagnostic node (DN) is proposed for solving the problem of RTCP broadcast traffic reducing.

References

[1] H. Schulzrinne, S. Casner, R. Frederick, V. Jacobson, "RTP: A Transport Protocol for RealTime Applications. RFC 3550," *Internet Engineering Task Force*, July 2003.

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