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[ITU Member]¹

ON THE REVISION OF RECOMMENDATION ITU-R M.1079

3GPP TSG RAN and TSG SA would like to thank ITU-R WP8F for the opportunity to comment on the current activities within ITU-R WP8F regarding the Revision of Recommendation ITU-R M.1079. The material attached to the Final Report of the Ottawa meeting has been reviewed and some general comments are provided in the following.

It is 3GPP TSG RAN and TSG SA understanding that there are no inconsistencies on the definition of QoS Classes in Recommendation ITU-R M.1079 between Sections 8.2 and 8.5.1 whose text is based on 3GPP Specifications TS 22.105 and TS 23.107. In fact, while TS 22.105 lists four groups of applications and their performance requirements from an end user perspective, TS 23.107 defines four UMTS Bearer Traffic Classes, with no specific one-to-one mapping being intended by 3GPP between the two classifications.

In line with this comment, 3GPP TSG RAN and 3GPP TSG SA have concerns with the amendments that ITU-R WP8F is considering for Section 8.2 of Recommendation ITU-R M.1079 in order to attempt to align definitions in TS 23.107 to those in TS 22.105. Specifically, 3GPP TSG RAN and TSG SA have concerns regarding the proposal by WP8F to consider that the interactive class, rather than the streaming class, is considered as intended to carry real-time traffic flows. Moreover it is 3GPP TSG RAN and TSG SA view that no order exists between the Traffic Classes in TS 23.107 and that there is no benefit to be gained from attempting to order these classes.

¹ This contribution was developed in 3GPP TSG RAN and TSG SA.

With specific regard to ITU-R M.1079 Section 8.2, 3GPP TSG RAN and TSG SA would recommend that current and future revisions be aligned to the currently agreed definition of Traffic Classes in 3GPP TS 23.107.

SA2 don't have any particular comment with regard to the remaining part of the material attached to the Final Report of the Ottawa meeting of ITU-R WP8F.

3GPP TSG RAN and TSG SA are also pleased to provide in Attachment 1 the text of Section 8.2 amended according to the comments above. In particular, 3GPP TSG RAN and TSG SA recognise that there is a need to further clarify these concepts in both TS23.107 and Recommendation ITU-R M.1079 and the proposed new text in Attachment 1 attempts to cover that (the same text was also included in TS23.107).

3GPP TSG RAN and TSG SA are looking forward to continue fruitful discussion with ITU-R WP 8F.

Proposed changes in Section 8.2 of Recommendation ITU-R M.1079

8.2 IMT-2000 QoS classes

When defining the IMT-2000 QoS classes the restrictions and limitations of the radio interface have to be taken into account. The QoS mechanisms provided in the IMT-2000 network have to be robust and capable of providing reasonable QoS resolution. Table 1 illustrates proposed QoS classes for IMT-2000.

In the proposal there are four different QoS classes (or traffic classes):

- conversational class
- streaming class
- interactive class
- background class.

The main distinguishing factor between these classes is how delay sensitive the traffic is: conversational class is meant for traffic which is very delay sensitive while background class is the most delay insensitive traffic class.

Conversational and streaming classes are mainly intended to be used to carry real-time traffic flows. The main divider between them is how delay sensitive the traffic is. Conversational real-time services, like videotelephony, are the most delay sensitive applications and those data streams should be carried in conversational class.

Interactive class and background are mainly meant to be used by traditional Internet applications like WWW, e-mail, Telnet, FTP and news. Due to looser delay requirements, compared to conversational and streaming classes, both provide better error rate by means of channel coding and retransmission. The main difference between interactive and background class is that interactive class is mainly used by interactive applications, e.g. interactive e-mail or interactive Web browsing, while background class is meant for background traffic, e.g. background download of e-mails or background file downloading. Responsiveness of the interactive applications is ensured by separating interactive and background applications. Traffic in the interactive class has higher priority in scheduling than background class traffic, so background applications use transmission resources only when interactive applications do not need them. This is very important in a wireless environment where the bandwidth is low compared to fixed networks.

However, these are only typical examples of usage of the traffic classes. There is in particular no strict one-to-one mapping between classes of service and the traffic classes defined above. For instance, a service interactive by nature can very well use the Conversational traffic class if the application or the user has tight requirements on delay.

TABLE 1
IMT-2000 QoS classes

Traffic class	Conversational class Real time conversation	Streaming class Real time streaming	Interactive class Interactive best effort	Background Background best effort
Fundamental characteristics	<ul style="list-style-type: none"> – Preserve time relation (variation) between information entities of the stream – Conversational pattern (stringent and low delay) 	<ul style="list-style-type: none"> – Preserve time relation (variation) between information entities of the stream 	<ul style="list-style-type: none"> – Request response pattern – Preserve payload content 	<ul style="list-style-type: none"> – Destination is not expecting the data within a certain time – Preserve payload content
Example of the application	– Voice	– Streaming video	– Web browsing	– Background download of e-mails

8.2.1 Conversational class

The most well known use of this scheme is telephony speech. But with Internet and multimedia a number of new applications will require this scheme, for example VoIP and videoconferencing tools. Real-time conversation is always performed between peers (or groups) of live (human) end-users. This is the only scheme where the required characteristics are strictly given by human perception.

The real-time conversation scheme is characterized by the transfer time that must be low because of:

- the conversational nature of the scheme;
- at the same time the time relation (variation) between information entities of the stream must be preserved in the same way as for real-time streams.

The maximum transfer delay is given by the human perception of video and audio conversation. Therefore the limit for acceptable transfer delay is very strict, as failure to provide low enough transfer delay will result in unacceptable lack of quality. The transfer delay requirement is therefore both significantly lower and more stringent than the round trip delay of the interactive traffic case.

Real-time conversation – fundamental characteristics for QoS:

- preserve time relation (variation) between information entities of the stream;
- conversational pattern (stringent and low delay).

8.2.2 Streaming class

When the user is looking at (listening to) real-time video (audio) the scheme of real-time streams applies. The real-time data flow is always aiming at a live (human) destination. It is a one-way transport.

This scheme is one of the newcomers in data communication, raising a number of new requirements in both telecommunication and data communication systems. It is characterized by the time relations (variation) between information entities (i.e. samples, packets) within a flow which must be preserved, although it does not have any requirements on low transfer delay.

The delay variation of the end-to-end flow must be limited, to preserve the time relation (variation) between information entities of the stream. But as the stream normally is time aligned at the receiving end (in the user equipment), the highest acceptable delay variation over the transmission media is given by the capability of the time alignment function of the application. Acceptable delay variation is thus much greater than the delay variation given by the limits of human perception.

Real-time streams – fundamental characteristics for QoS:

- preserve time relation (variation) between information entities of the stream.

8.2.3 Interactive class

When the end-user, that is either a machine or a human, is online requesting data from remote equipment (e.g. a server), this scheme applies. Examples of human interaction with the remote equipment are: Web browsing, database retrieval, server access.

Examples of machines interaction with remote equipment are: polling for measurement records and automatic database enquiries (tele-machines).

Interactive traffic is the other classical data communication scheme that on an overall level is characterized by the request response pattern of the end-user. At the message destination there is an entity expecting the message (response) within a certain time.

Round trip delay time is therefore one of the key attributes. Another characteristic is that the content of the packets must be transparently transferred (with low BER).

Interactive traffic – fundamental characteristics for QoS:

- request response pattern;
- preserve payload content.

8.2.4 Background class

When the end-user, that typically is a computer, sends and receives data-files in the background, this scheme applies. Examples are background delivery of e-mails, SMS, download of databases and reception of measurement records.

Background traffic is one of the classical data communication schemes where an overall level is characterized by the absence of any parameter at the destination expecting to receive the data within a certain time limit. The scheme is thus more or less delivery time insensitive. Another characteristic is that the content of the packets must be transparently transferred (with low BER).

Background traffic – fundamental characteristics for QoS:

- the destination is not expecting the data within a certain time;
- preserve payload content.