Presentation of Specification to TSG

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Packet-switched Streaming Services (PSS); General Description

3G TS 26.233 V1.0.0 (2000-12)

Technical Specification

3rd Generation Partners
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Introduction

Streaming refers to the ability of an application to play synchronised media streams like audio and video streams in a continuous way while those streams are being transmitted to the client over a data network.

Applications, which can be built on top of streaming services, can be classified into on-demand and live information delivery applications. Examples of the first category are music and news-on-demand applications. Live delivery of radio and television programs are examples of the second category.

Streaming over fixed-IP networks is already a major application today. While IETF and W3C have developed a set of protocols used in fixed-IP streaming services, no complete standardised streaming framework has yet been defined. For 3G systems, the 3G packet-switched streaming service (PSS) fills the gap between 3G MMS, e.g. downloading, and conversational services.

PSS enables mobile streaming applications, where the protocol and terminal complexity is lower than for conversational services, which in contrast to a streaming terminal require media input devices, media encoders and more complex protocols.

This document defines the overall architecture of 3G packet-switched streaming services (3G PSS).

Scope

The present document contains a general description of a packet-switched streaming service in 3G networks. In particular, it defines the overall architecture and terminal related components. Protocols and codecs are defined in [1].

References

[1] 3G TS 26.234, Packet-switched streaming services, Protocols and Codecs.

[2] H. Schulzrinne S. Casner et al., "RTP: A Transport Protocol for Real-Time Applications", RFC1889, January 1996.

[3] H. Schulzrinne , A. Rao, R. Lanphier, "Real Time Streaming Protocol (RTSP)", RFC2326, April 1998.

[4] M. Handley and V. Jacobson, "SDP: Session Description Protocol", RFC 2327, April 1998.

Abbreviations

For the purposes of the present document, the following abbreviations apply

DRM	Digital Rights Management
FFS	For Further Study
GIF	Graphics Interchange Format
HTML	HyperText Markup Language
IETF	Internet Engineering Task Force
IP	Internet Protocol
MMS	Multimedia Messaging Service
PSS	Packet-switched Streaming Service
RAB	Radio Access Bearer
RFC	IETF Request For Comments
RTP	Real-time Transport Protocol
RTSP	Real-Time Streaming Protocol
SDP	Session Description Protocol
TCP	Transport Control Protocol
UDP	User Datagram Protocol
URI	Universal Resource Identifier
WAP	Wireless Application Protocol
WWW	World Wide Web

Usage scenarios

Applications

The streaming platform supports a multitude of different applications including streaming of news at very low bitrates using still images and speech, music listening at various bitrates and qualities, video clips and watching live sports events.

Use case descriptions

Simple streaming

The simple streaming service includes a basic set of streaming control protocols, transport protocols, media codecs and presentation and layout control protocol. In this simple case, there is neither explicit capability exchange, nor any encryption or digital rights management.

A mobile user gets a URI to specific content that suits his or her terminal. This URI may come from a WWW-browser, a WAP-browser, or typed in by hand. This URI specifies a streaming server and the address of the content on that server. An application that establishes the multimedia session should understand a Session Description Protocol (SDP) file. The SDP file may be obtained in a number of ways. It may be provided in a link inside the HTML page that the user downloads, via an embed tag. It may also be directly obtained by typing it as a URI. It may also be obtained through RTSP [3] signalling via the DESCRIBE method. The SDP file contains the description of the session (session name, author, …), the type of media to be presented, and the bitrate of the media.

The session establishment is the process in which the browser or the mobile user invokes a streaming client to set up the session against the server. The client may be able to ask for more information about the content. It may also choose to set up a specific bearer for the streaming media. The set up of the streaming service is done by sending an RTSP SETUP message for each media stream chosen by the client. This returns the UDP and/or TCP port etc. to be used for the respective media stream. The client sends a RTSP PLAY message to the server that starts to send one or more streams over the IP network.

This case is illustrated below in Figure 1.

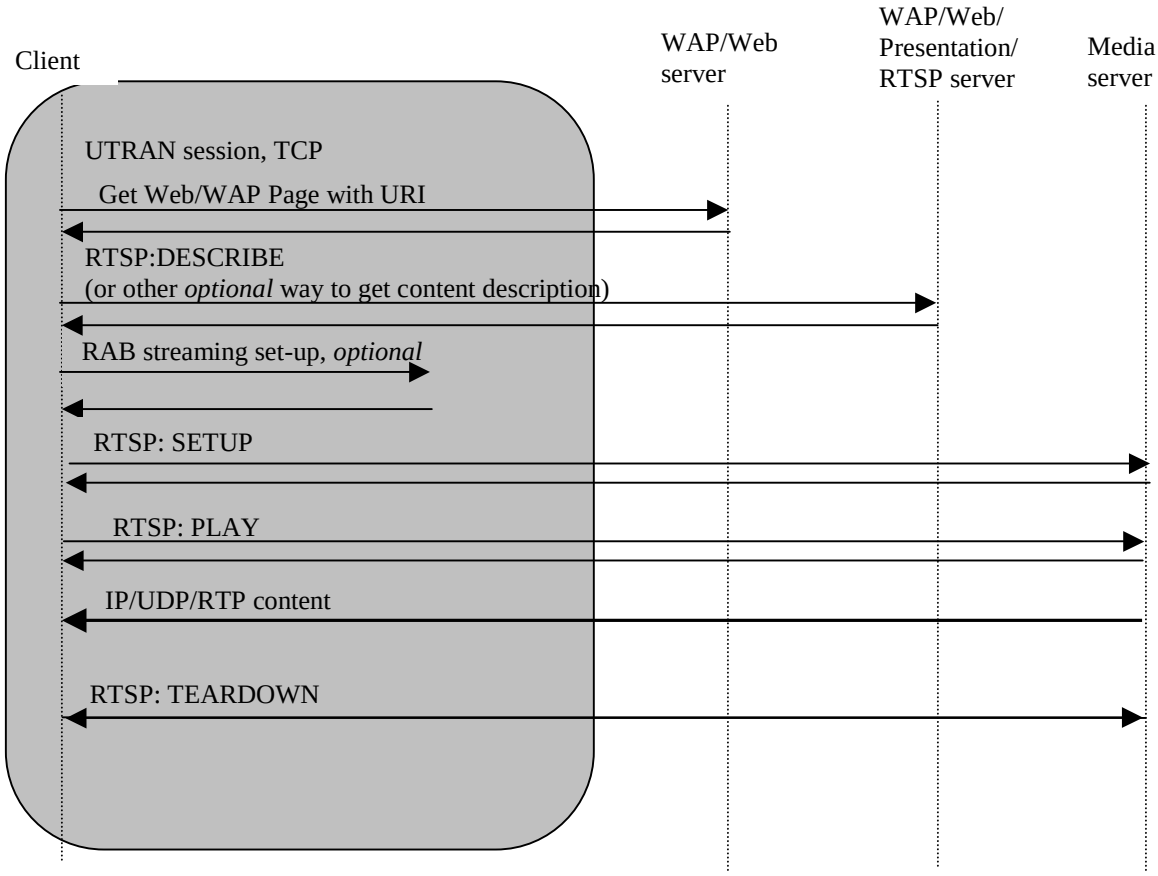

Figure 1: Schematic view of a simple streaming session

Other streaming cases

[Extended streaming service will support all features defined for the simple streaming case and additionally includes capability exchange, interworking with core network services, security and Digital Rights Management. These cases are FFS.]

[Editor's Note: The two-phase approach for PSS has been agreed. Exact split of features between the two cases is to be decided.]

General network architecture

Figure 2 shows the most important network entities involved in a 3G packet -switched streaming service. A streaming service requires at least a content server and a streaming client. Additional components like portals, profile servers caching servers and proxies might be involved as well to provide additional services or to improve the overall service quality.

Portals are servers allowing convenient access to streamed media content. For instance, a portal might offer content browse and search facilities. In the simplest case, it is simply a Web/WAP-page with a list of links to streaming content. The content itself is usually stored on content servers, which can be located elsewhere in the network.

User and terminal profile servers are used to store user preferences and terminal capabilities. This information can be used to control the presentation of streamed media content to a mobile user.

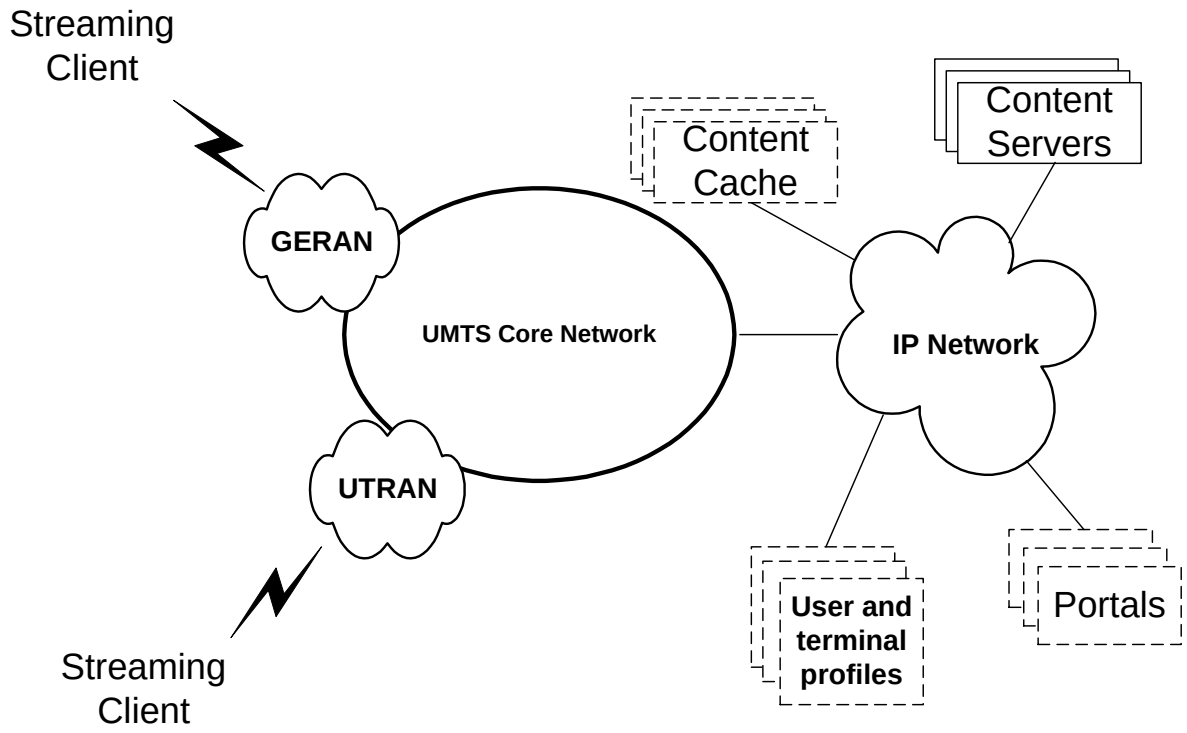

Figure 2: Network elements involved in a 3G packet switched streaming service

Functional components of a PSS terminal

This chapter lists the 3G packet-switched streaming service components, which belong to the terminal. Note that not all of the components need to be mandatory. The functional behaviour of the different components is discussed in the following.

Session protocols and data transport

Protocols are needed for session establishment, session setup, session control, capability exchange, and data transport of streaming media and other data. The protocols to be used are specified in [1].

Codecs

Codecs are needed for speech, audio, video, still images, bitmap graphics, vector graphics and text. The codecs to be used are specified in [1].

File format

The file format is an important element of the content manipulation chain. Conceptually, there is a difference between the coding format and the file format. The coding format is related to the action of a specific coding algorithm that codes the content information into a codestream. The file format is instead a way of organising the prestored codestream in such way that it can be accessed for local decoding and playback, or transferred as a file on different media, or streamed over different transport. Some file formats are optimised for one or more of these functions, others aim instead at achieving a higher flexibility.

When a single media type is involved, the coding and the file format are often considered, and referred to, as a single entity. When multimedia information is involved, instead, it is appropriate to maintain, at least conceptually, the distinction between these two instances. The file format can play an important role in facilitating the organisation and the access to the coded information, independently of the specific coding formats.

[Editor's note: SA4 may come up with a decision to recommend a specific (optional) file format to be used in the PSS compatible content servers providing prestored content, to enable maximum flexibility in serving the codestreams for the end user. There is no SA4 decision yet whether such recommendation should be already in the simple streaming (Release 4) or in the extended service (Release 5).]

Interworking with other core network services

[Editor's note: Is interworking with HSS/user profiles or IM sub-system functions required?]

[Editor's note: Relation to MexE, including UAProf work performed by TSG-T2 is to be clarified.]

Interworking with WAP

FFS

Interworking with MMS

FFS

Interworking with charging/billing services

FFS

Security

FFS

Digital Rights Management

Standardisation of 3G packet switched streaming services need to be aligned with standardised or industry solutions for media rights management. The specification of an appropriate DRM framework is FFS.

Annex A (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**