3GPP TSG SA WG4 Meeting #18   **SA4-010535**
Erlangen, 3rd – 7th September 2001

Title:	**Reply to LS on stage 1 for Extended Streaming Service**
Source:	**S4**
To:	**S1 ad-hoc on Streaming, S1**
Cc:	**S3, S5, T2**
Response to:	LS 9th July 2001 on stage 1 for Extended Streaming Service from S1 (Services)

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Attachments: Revised Stage 1 PSS Draft

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1. Overall Description:

S4 would like to thank S1 for providing the draft PSS Stage 1 TS v0.2.0 (S1-010836) through liaison TSG S1-010837. S4 have reviewed this document and proposed the following changes (the text in the draft specification has been change-marked accordingly; the revised document is included with this liaison):

Section	Comments
Title of the Stage 1	Changed to reflect the agreed Work Item service description: 'Transparent End-to-End Packet-switched Streaming Service'. *Note that 'Extended PSS' is an internal TSG SA4 PSM working reference for PSS work under Rel5*
Introduction & Background	Changes have been suggested that TSG SA4 feel provide a more accurate and succinct description of streaming media services.
Definitions	Clarification of the role of the 'Server'.
Definitions	Definition of 'Streaming' added.
5.1 General	The requirement for backwards compatibility has been reinforced.
5.1 General	The requirement for interoperability with external industries has been reworded for clarification.
5.2 Service Optimisation	Deletion of the requirement to adapt PSS during a session to accommodate changes in device capabilities and user preferences (it is not foreseen by TSG SA4 that this will be a requirement but please advise otherwise).
5.4 Transport	Deletion of reference to Server in QoS management (the server has no direct mechanism for requesting QoS).
5.5 Service provisioning	Addition of the ability to jump to another part of the media clip (i.e., random access).
5.5.1 Media Types	TSG SA4 consider that it may not be appropriate to explicitly specify only Media Type requirements in a Stage 1 document. TSG SA4 would suggest that the Stage 1 first needs to clarify the applications and service capabilities that must be supported by the PSS service (which would then determine the Media Type requirements).

S4 would welcome a joint adhoc meeting with the S1 Streaming working group to further develop the PSS Stage 1 specification.

2. Actions:

To   S1 (Streaming working group)

ACTION: S4 PSM sub-working group would like to co-ordinate a joint Streaming Adhoc meeting with S1 to further develop the PSS Stage 1 specification.

Date of next Plenary meeting TSG-SA WG4
03 – 07 Dec 2001 **TSG-SA WG4#19**   Host: NTT DoCoMo, Venue: Tokyo, Japan.

3G TS 22.xxx 0.2.0 (2001-07)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects
Service aspects;
Stage 1
~~Extended~~ Transparent End-to-End Packet-switched Streaming
Service
(3G TS 22.xxx Release 5)

Keywords

UMTS, service, streaming

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Contents

Foreword

This Technical Specification has been produced by the 3GPP.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TR, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x   the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3 or greater   indicates TSG approved document under change control.

y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z   the third digit is incremented when editorial only changes have been incorporated in the specification.

Introduction

NOTE : ~~Release 5 service is called : Extended PS Streaming Service (PSS-E)~~

The Streaming service introduces means for an application to play ~~synchronised~~ media streams like audio and video in a continuous way while the streams are being transmitted to the client over the data network.

Streaming services are required whenever instant access to multimedia information needs to be integrated into an interactive media application. This has to be seen in contrast to other multimedia services like for instance MMS where multimedia content is delivered to the user asynchronously by means of a "message".

Interactive applications that use streaming services ~~can be classified into~~include on-demand and live information delivery applications. Examples of the first category are music, music videos and news-on-demand applications. Live delivery of radio and television programs are examples of the second category, this could e.g. make it possible to listen to domestic radio while abroad.

Besides application focusing on multimedia content delivery only, streaming services can be nicely integrated as an add-on to applications like mobile cinema ticketing where the user gets the possibility to view trailers of films she is interested in.

Background:

A web server works with requests for information, it delivers that particular information as fast as possible, completes the transaction, disconnects and goes on to other requests. A client connects to a web server only when it needs information. ~~The rest of the time the server and client ignore each other.~~ This strategy works well as long as pictures and text~~s~~ are to be received. If a client wants to watch video or listen to audio, the entire file must be received before it can be played. The problem is that these kinds of files can be very large thus potentially causing storage problems in the client and the transmi~~ssion~~tting time ~~with for example a 28.8K modem would be very long~~may also be long. A streaming service improves this by removing the need~~Instead of waiting~~ for the content to be delivered in its entirety, ~~entire media file to be received,~~ instead the ~~file~~media could be rendered from the moment the data starts to arrive ~~played during the time it arrives~~. ~~To make this possible a continuous connection would be required between the server and the client. While the client receives the file it plays it as well. Instead of using a web server, special streaming servers are used. These servers have the ability to stream media without disconnecting to the client during a session.~~

3G mobile telephone systems will thanks to the larger bandwidth offer new possibilities and services. One of these new services will offer the ability to stream sound and movies to mobile devices. Today this possibility exists only for computer users connected to the Internet via a fast connection.

~~The idea of streaming is the ability to watch/listen to media while it is transmitted. This offers many advantages. The user does not have to wait for the entire media content to be received, a client receiving a stream does not have to have enough memory to store the whole media file, i.e. only fractions of the data have to be stored. This is a great advantage when the receiving platform is a mobile phone and the memory is limited. In addition the fact that in the streaming case the content need not to be stored completely on the receiving device is advantageous for content protection purpose~~

1 Scope

This Technical Specification defines the stage one description of the Packet-switched Streaming Service. Stage one is the set of requirements that shall be supported for the provision of a streaming service, seen primarily from the subscriber's and service providers' points of view.

This TS includes information applicable to network operators, service providers, terminal and network manufacturers.

This TS contains the core requirements for the Streaming Service, which are sufficient to provide a complete service.

2 References

The following documents contain provisions that, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] 3G TS 22.101: "Service Principles"

[2] 3G TS 21.133: "3G Security; Security Threats and Requirements"

[3] 3G TS 22.105: "Services and Service Capabilities"

[4] 3G TS 26.233: "Transparent End to End Packet Switched Streaming Service (PSS) : General Description"

[5] 3G TS 26.234: "Transparent End to End Packet Switched Streaming Service (PSS) : Protocol and Codecs"

3 Definitions and abbreviations

3.1 Definitions

Client: in the context of Streaming service the client is a device (or service) that is the subject to receive streamed content from a server.

Server: a device (or service) that passively waits for connection requests from one or more clients. A server may accept or reject a connection to a client as part of a service (streaming). On accepting a connection request, the server will deliver requested media to the client.

Streaming : (tbd) Streaming defines a mechanism whereby media streams can be rendered at the same time that they are being transmitted to the client over the data network.

Terminal Profile: Set of information about the physical capabilities of the terminal.

User Profile: Is the set of information necessary to provide a user with a consistent, personalised service environment, irrespective of the user's location or the terminal used (within the limitations of the terminal and the serving network).

3.2 Abbreviations

CODEC: ~~COmpression~~ ~~COder~~ / ~~DECompression~~DECoder

MMS – Multimedia Messaging Service

PS – Packet Switched

QoS – Quality of Service

UE – User Equipment

4 Entities involved in Streaming service

The figure shows the basic entities involved in the Streaming service and how they connect.

Clients initiate the service and connect to the selected Streaming server. Content creation servers generates live content e.g. video from a concert. User profile and terminal capability data can be stored on a network server and will be contacted at the initial set up. User Profile will provide the Streaming service with the user's preferences. Terminal capabilities will be used by the Streaming service to decide whether or not the client is capable of receiving the streamed content.
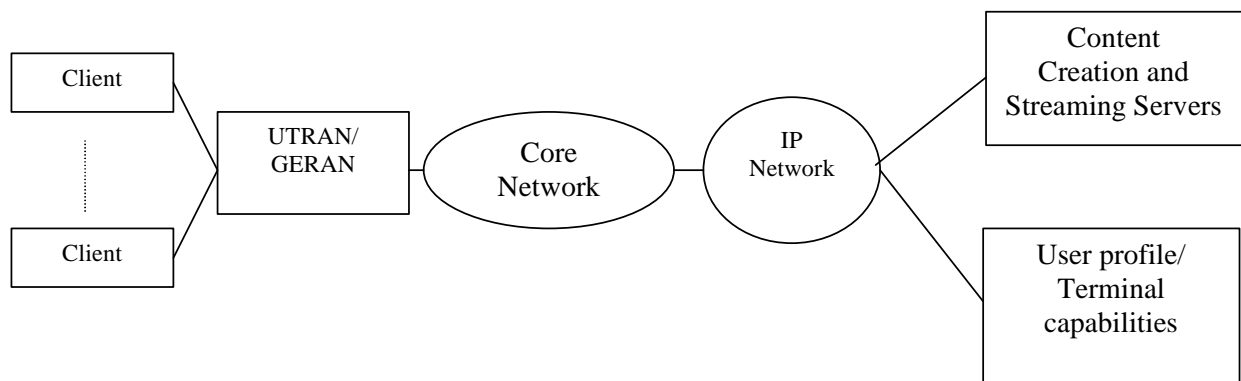
NOTE : further work required, see figure 2 in 26.233

5 Requirements

5.1 General

- The ~~Extended~~ Transparent End-to-End Packet ~~-s~~ Switched Streaming Service (~~PSS~~ EPSS) shall add enhanced capabilities to the existing Transparent End-to-End Packet ~~-s~~ Switched Streaming Service (PSS)[TS26.233 and 26.234] ~~with considering~~

- Backwards compatibility shall be maintained (i.e., a Rel4 client should be able to interoperate with a Rel5 server and vice versa)~~.~~

- The Streaming service uses a Client / Server model. The client controls the server by sending requests to the server, which responds to these commands.

- The ~~PSS~~ EPSS shall support downlink and uplink streaming from the ~~PSS~~ EPSS clients.

- The Streaming Service should consider interoperability ~~take into account as much as possible on~~ with streaming elements (protocols, formats etc) already in use in other~~the industry~~ industries (e.g. the internet).

- The Streaming service mechanisms shall:

  - use open standards where these are available for Streaming service requirements

  - use standard procedures and interfaces to avoid interoperability problems

- propose extensions to existing standards if needed

5.2 Service Optimisation

- For the purpose of optimized presentation of the media streaming, ~~PSS~~ EPSS shall include capability exchange and negotiation mechanisms on server/client capabilities and user preferences at the session set up ~~as well as in the communication~~.

5.3 Service Activation and Invocation

An application that wants to access specific content needs a URI address to a streaming server. The address may be typed in by hand, it can come from e.g. a WWW-browser, a WAP-browser or it can be stored in the application itself.

- The client shall initiate the Streaming service.

- The Streaming service shall be gracefully disconnected if the client is not capable of handling the streamed content.

- The end user should be notified if the Streaming service is unavailable.

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- The streaming service should not prevent the user from interacting with the terminal e.g. accepting an incoming call

5.4 Transport

- Quality of Service (e.g. time delay) requirements shall be in accordance with requirements in 22.105 (ref. 3)

- The Streaming service should be able to work over different QoS bearers

- The streaming service transport shall be provided by the PS Domain

- The ~~PSS~~ EPSS should provide mechanisms for streaming servers and clients to adapt to the network conditions in order to achieve significant improvement in the quality of streaming, e.g. using information on end-to-end transport quality from the network.

- The ~~PSS~~ EPSS client ~~and the PSS-E server~~ may request appropriate QoS for the session to be activated. QoS shall be set at the beginning of session setup ~~and shall capable to be changed by~~ either based on ~~server's/~~the client's request or local operator's policy.

5.5 Service Provisioning and Characteristics

- The client shall have the possibility to stop/reject the ~~on-demand and the live~~ Streaming service after it has been invoked.

  e.g. if a client has activated the Streaming service and then get a phone call, he/she shall be able to decide whether or not he/she wants the Streaming service to continue. After a stop/reject the client has to activate the service again to continue.

- The client shall have the possibility to pause ~~the on-demand and the live~~ Streaming service after it has been invoked.

- The client shall have the possibility of jumping to another point within the media clip (i.e., random access)~~fast forwarding/rewinding the Streaming service~~

  ~~When the client decides to continue the on-demand Streaming service, the streamed data shall resume from the pause point, i.e. the point where the streamed data was halted. When the client decides to continue the live Streaming service, the streamed data shall continue from where it is at that moment.~~

5.5.1 Media Types

- The streaming service should consider the specification of multiple media types to guarantee that rich, compelling multimedia services can be provisioned for example:

For the purpose of providing improved quality media, the PSS-E clients and servers should support improved and additional new media types such as:

  - (graphics (2D and 3D)

  - synthetic audio (e.g. MIDI)

  - enhanced audio and video codecs (e.g. higher levels and profiles and/or new codecs)

  - enhanced scene description (e.g. new features and/or functionality)

  - metadata

  - formatted text (e.g. decorated captions, which synchronize with music, movie and etc.))

- The number of implementations of eachPSS-E media types should be kept to a minimum, considering the implementation impact to the terminals, interoperability, contents mobility and backward compatibility.

5.5.2 Profiles

- The Streaming service should support the ability for the client to have specific preferences described in the user profile.

  For example if the user wants to watch a news show the preferred language is specified in the user profile.

- The Streaming service shall support a basic set of physical terminal capabilities.

  When the Streaming server is about to set up the streaming session the server needs to know if the client can handle the data which is about to be streamed. These capabilities can for example be stored in the network.

6 Security

The user shall be able to use the Streaming service in a secure manner. Mechanisms shall be provided to ensure that the Streamed data only is sent to and accessed by the intended end-user(s).

The "Security Threats and Requirements" specified in 21.133 [2] shall not be compromised.

The following requirements shall be considered:

- Streaming services may support end-to-end security (e.g. between the Content server and the Streaming client i.e. the UE).

7 Charging

Streaming services should support various charging mechanisms,

It shall be possible to include the following streaming specific data in the CDRs as charging information if available :

- message type, length etc

- time of start of delivery

- duration

- Streaming service sender / -recipient

- number of Streaming events sent

- number of Streaming events received.

- media

8 Digital Rights Management

DRM might be desirable depending on content type and value, this chapter is for further study.

- The Streaming service may support different levels of DRM

- The Streaming client should be able to handle content using DRM

9 Interworking

Interworking with conversational multimedia services is important since streaming could be a useful component in many conversational multimedia applications. Interworking with MMS is especially important because there are application scenarios where media delivery via a streaming service could be replaced by media delivery via MMS as a fall back solution.

- The Streaming service shall share media CODECs with other 3G multimedia services to allow easy interworking when needed,

  e.g. interworking with MMS

  NOTE : relationship with Multimedia Broadcast/Multicast Service) MBMS, Push is for further study.

Annex A (informative):
Change history

V. 0.1.0	May 2001	First Draft (Presented at TSG-SA-WG1 #12)
v.0.2.0	July 2001	Second Draft (Presented at TSG-SA-WG1 #13)

Change history										
TSG SA#	**SA Doc.**	**SA1 Doc**	**Spec**	**CR**	**Rev**	**Rel**	**Cat**	**Subject/Comment**	**Old**	**New**