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Protocol for Reliable Data Service between UE and SCEF;
Stage 3
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Contents

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1 Scope

The present document specifies a Reliable Data Service (RDS) protocol between the UE and Service Capability Exposure Function (SCEF).

The present document defines the frame structure, format of fields and procedures for operation of the RDS protocol. RDS is mainly intended to be used for acknowledged data transfer, but it also supports unacknowledged data transfer.

The present document is applicable to the UE and to the SCEF in the Evolved Packet System (EPS).

2 References

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

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[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.682 [2] apply:

SCEF

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

RDS Reliable Data Service

4 Overview

4.1 General

The Reliable Data Service (RDS) protocol supports the following requirements:

- RDS supports peer-to-peer data transfers and shall provide reliable data delivery between the UE and the SCEF. The data is transferred via a PDN connection between the UE and SCEF.
- A UE can connect to multiple SCEFs. A UE can connect to multiple SCS/AS via the SCEF.
- RDS shall support multiple applications on the UE to simultaneously conduct data transfers with their peer entities on the SCEF using a single PDN connection between the UE and SCEF.
- RDS shall support both acknowledged and unacknowledged data transfers.
- RDS shall support variable-length frames and shall allow detection and elimination of duplicate frames at the receiving endpoint.

4.2 Reference Model

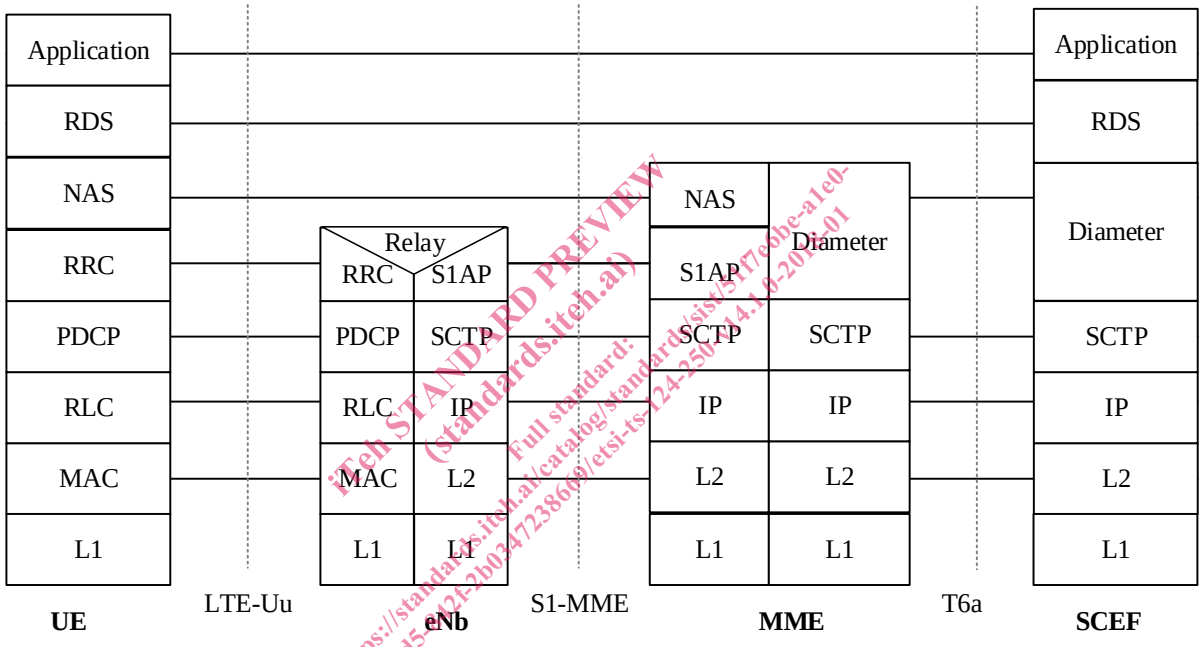

Figure 4.2-1: Protocol layering for reliable data transfer between UE and SCEF via E-UTRAN

The reference model showing the protocol layering for reliable data transfer between UE and SCEF is illustrated in figure 4.2-1. The RDS operates above the NAS and Diameter layers in the reference architecture.

4.3 Description of RDS protocol

4.3.1 Protocol functions

RDS establishes a peer-to-peer logical link between the UE and SCEF. The logical link is identified by a pair of port numbers and EPS bearer ID. Each port number is used to identify an application on the UE side or SCEF side and is carried in the address field of each frame. The source port number identifies the application on the originator and the destination port number identifies the application on the receiver. When a single application on the originator conducts data transfer with a single application on the receiver, the source port number and destination port number need not be used. Each RDS frame shall consist of a header and an information field of variable length. The header shall contain information about port numbers and the frame number that is used to identify the frame and provide reliable transmission. The information field contains the payload to be transferred between the UE and SCEF.

The UE establishes a PDN connection with the SCEF either during Attach or through UE requested PDN connectivity. The UE shall use the EPS bearer ID to select the bearer to transfer RDS PDUs to the SCEF. The EPS bearer ID identifies the destination (at the UE or SCEF) and is not carried in the frame as it is already included in the NAS ESM

message header. Once the UE and network successfully negotiate to use RDS for a particular PDN connection, the PDN connection shall transfer data only using RDS protocol.

RDS shall support both single and multiple applications within the UE. RDS shall provide fuctionality for flow control and sequence control to maintain the sequential order of frames across the logical link.

4.3.2 Acknowledged operation

In acknowledged operation the information is transmitted in order in numbered Information (I) frames. The I frames are acknowledged at the RDS layer. Error recovery and reordering mechanisms based on retransmission of acknowledged I frames are specified. Several I frames can be acknowledged at the same time. Flow control is implemented via a sliding window mechanism.

The procedure for establishment of acknowledged transfer is described in clause 6.

4.3.3 Unacknowledged operation

In unacknowledged operation the information is transmitted in numbered Unconfirmed Information (UI) frames. The UI frames are not acknowledged at the RDS layer. Error recovery and reordering mechanisms are not defined. Duplicate UI frames are discarded. Flow control procedures are not defined.

5 Frame structure and format of fields

5.1 General

The peer-to-peer transfers using RDS shall conform to the frame format as shown in figure 5.1-1. The frame header shall consist of the Address and Control field and is a minimum of 1 octet and a maximum of 3 octets long. The Information field is of variable length.

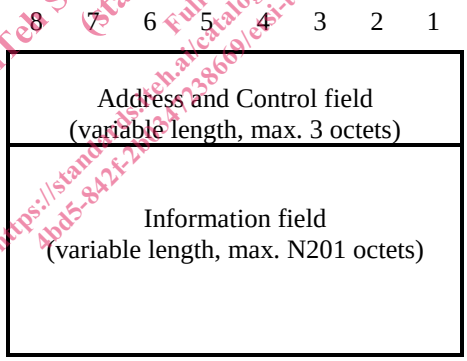

Figure 5.1-1: RDS frame format

5.2 Address and Control field

5.2.1 Address and Control field format

The Address and Control field identifies the type of frame and consists of minimum of 1 octet and maximum of 3 octets. The following types of control field frames are specified:

- confirmed information transfer (I frame);
- supervisory functions (S frame);
- unconfirmed information transfer (UI frame); and
- control functions (U frame).

The address and control field format for RDS is shown in figure 5.2.1-1.The description of address and control field bits is shown in Table 5.2.1-1.

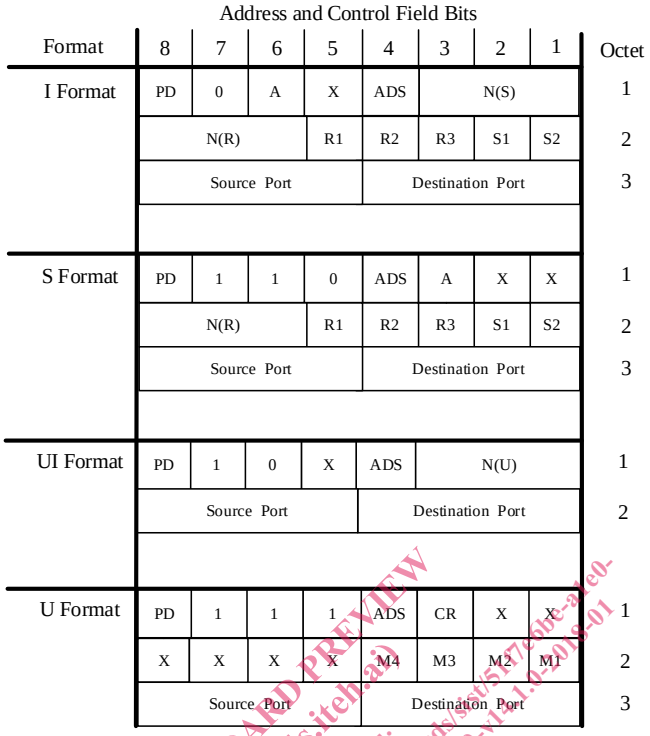

Figure 5.2.1-1: Address and Control field format