|  |  |
| --- | --- |
| 3GPP TS ab.cde V0.0.0 (2021-02) | |
| Technical Specification | |
| 3rd Generation Partnership Project;  Technical Specification Group Services and System Aspects;  5G System Enhancements for Edge Computing;  Stage 2  (Release 17) | |
|  | |
|  |  |
|  | |
| The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for the purposes of 3GPP. The present document has not been subject to any approval process by the 3GPPOrganizational Partners and shall not be implemented. This Specification is provided for future development work within 3GPPonly. The Organizational Partners accept no liability for any use of this Specification. Specifications and Reports for implementation of the 3GPP TM system should be obtained via the 3GPP Organizational Partners' Publications Offices. | |

|  |
| --- |
|  |
| ***3GPP***  Postal address  3GPP support office address  650 Route des Lucioles - Sophia Antipolis  Valbonne - FRANCE  Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16  Internet  http://www.3gpp.org |
| ***Copyright Notification***  No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.  © 2021, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  All rights reserved.  UMTS™ is a Trade Mark of ETSI registered for the benefit of its members  3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners LTE™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners  GSM® and the GSM logo are registered and owned by the GSM Association |

Contents

Foreword 4

1 Scope 5

2 References 5

3 Definitions of terms, symbols and abbreviations 5

3.1 Terms 5

3.2 Symbols 5

3.3 Abbreviations 5

4 Architectural Assumptions and Principles 6

4.1 General 6

4.2 Architecture assumptions 6

4.3 Connectivity models 6

5 Functional Description for Supporting Edge Computing 6

6 Procedures for Supporting Edge Computing 6

6.1 General 6

6.2 EAS discovery and re-discovery 6

6.2.1 General 6

6.2.2 EAS (re-)discovery over Distributed Anchor connectivity model 6

6.2.2.1 General 6

6.2.2.2 EAS discovery procedure 6

6.2.2.3 EAS re-discovery procedure at Edge relocation 7

6.2.3 EAS (re-)discovery over Session Breakout connectivity model 7

6.2.3.1 General 7

6.2.3.2 EAS discovery procedure 7

6.2.3.3 EAS re-discovery procedure at Edge relocation 7

6.2.4 EAS (re-)discovery over Multiple Sessions connectivity model 7

6.2.4.1 General 7

6.2.4.2 EAS discovery procedure 7

6.2.4.3 EAS re-discovery procedure at Edge relocation 7

6.3 Edge Relocation 7

6.3.1 General 7

6.3.2 Edge relocation triggered by AF 7

6.3.3 Edge relocation using EAS IP replacement 7

6.3.4 Simultaneous connectivity for source and target EASs 8

6.3.5 Packet buffering for low packet loss 8

6.4 Network Exposure to Edge Application Server 8

6.4.1 General 8

6.4.2 Network Exposure to Edge Application Server via Local NEF 8

6.5 Support of Application Layer Architecture for Enabling EC 8

6.5.1 General 8

6.5.2 ECS address provisioning 8

7. Network Function Services and descriptions 8

Annex A (Informative): EAS discovery using 3rd party DNS server 9

Annex B (Informative): Application layer based EAS (re-)discovery 9

Annex C (informative): Change history 9

# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (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 the present document, 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 document.

# 1 Scope

The present document …

# 2 References

The following documents contain provisions which, 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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

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

[2] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System".

[5] 3GPP TS 23.558: "Architecture for enabling Edge Applications (EA)".

# 3 Definitions of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms 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].

**<defined term>:** <definition>.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

## 3.3 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].

<ABBREVIATION> <Expansion>

# 4 Architectural Assumptions and Principles

Editor’s Note: Bring assumptions, connectivity models and hosting models from the TR clause 4. Privacy considerations in TR clause 7.12. could also considered here.

## 4.1 General

Editor’s Note: This chapter refers to TS 23.501 chapter 5.13 for an overview of the 3GPP specified functions which are part of 5GC Support to Edge Computing

## 4.2 Architecture assumptions

## 4.3 Connectivity models

# 5 Functional Description for Supporting Edge Computing

Editor’s Note: LDNSR is specified here: role, functionality and depolyment

Editor’s Note: This clause also brings clarity in the high-level relation between the solutions described in this TS and solutions built on SA6 Architecture for Enabling Edge Applications.

# 6 Procedures for Supporting Edge Computing

## 6.1 General

Editor’s Note: Any requirements on the applications and solution limitations are documented. For the detailed procedures for the management of the connectivity and run-time coordination with the application layer this clause refers to TS 23.502 and to TS 23.503 for the details on the Policy and Charging Control aspects.

## 6.2 EAS discovery and re-discovery

### 6.2.1 General

Editor’s Note: This clause describes general parts including e.g. privacy considerations, which DNS properties that are enabling DNS based Edge AS Discovery, recommendations/limitations for cases that OS/user overrides DNS setting.

### 6.2.2 EAS (re-)discovery over Distributed Anchor connectivity model

#### 6.2.2.1 General

#### 6.2.2.2 EAS discovery procedure

Editor’s Note: This clause describes the procedure for Edge AS Discovery over Distributed Anchor connectivity model according to the recommendations in the conclusions in the TR clause 9.1.2 (selected parts from Sol 2/4/5/10).

#### 6.2.2.3 EAS re-discovery procedure at Edge relocation

Editor’s Note: This clause also describes rediscovery (UE based), and aspects and assumptions based on applicable clause 9.2.2 in the TR

### 6.2.3 EAS (re-)discovery over Session Breakout connectivity model

#### 6.2.3.1 General

#### 6.2.3.2 EAS discovery procedure

Editor’s Note: This clause describes the procedure for Edge AS Discovery over *Session Breakout* connectivity model according to the recommendations in the conclusions in the TR clause 9.1.4.

#### 6.2.3.3 EAS re-discovery procedure at Edge relocation

Editor’s Note: This clause also describes rediscovery (UE based), and aspects and assumptions based on applicable clause 9.2.2 in the TR.

### 6.2.4 EAS (re-)discovery over Multiple Sessions connectivity model

Editor’s Note: TBD whether this should be in new TS or changes to TS 23.501/503 based on exact input contribution.

#### 6.2.4.1 General

#### 6.2.4.2 EAS discovery procedure

Editor’s Note: This clause describes the procedure for Edge AS Discovery over Multiple Sessions connectivity model according to the recommendations in the conclusions in the TR clause 9.1.1 (sol #1 + sol #13 6.13.1.2).

#### 6.2.4.3 EAS re-discovery procedure at Edge relocation

Editor’s Note: This clause also describes rediscovery (UE based), and aspects and assumptions based on applicable clause 9.2.2 in the TR.

## 6.3 Edge Relocation

### 6.3.1 General

### 6.3.2 Edge relocation triggered by AF

Editor’s Note: this clause refers to TS 23.502 for procedures addressing the multiple AF scenario (e.g. central and distributed AFs for EC) like AF relocation at Edge relocation proposed in clause 9.2.6, and AF provide DNAI and target N6 info to the SMF as concluded in 9.2.3 in TR.

### 6.3.3 Edge relocation using EAS IP replacement

Editor’s Note: This clause describes seamless change of Edge AS using address replacement in the UPF to keep the UE unaware of the EAS change as in clause 9.2.5.

### 6.3.4 Simultaneous connectivity for source and target EASs

Editor’s note: This clause describes seamless change of Edge AS using simultaneous connectivity for source and target EAS to reduce latency and packet loss. Whether this clause is needed is TBD based on actual contribution inputs.

### 6.3.5 Packet buffering for low packet loss

Editor’s Note: This clause describes seamless change of Edge AS using buffering of packets as in clause 9.2.1 to reduce packet loss.

## 6.4 Network Exposure to Edge Application Server

### 6.4.1 General

Editor’s Note: This clause describes how to expose information that needs to be delivered timely to applications deployed in edge hosing environments. This clause refers to TS 23.501, TS 23.502 and TS 23.503 for detailed exposure procedures including the enhancements proposed in TR 23.748 clause 9.4. Privacy considerations might be addressed as well.

Editor’s Note: New clauses 6.4.x may be added later for alternative solutions described in NOTES in 9.4 based on input contributions.

### 6.4.2 Network Exposure to Edge Application Server via Local NEF

Editor’s Note: This clause describes network exposure via local NEF as described in bullets in TR 23.748 clause 9.4.

## 6.5 Support of Application Layer Architecture for Enabling EC

### 6.5.1 General

Editor’s Note: This clause refers to TS 23.558 for the specifications of the Discovery over the Architecture Enabling Edge Applications.

### 6.5.2 ECS address provisioning

Editor’s Note: This clause describes here the procedure agreed in conclusions in 9.1.3.

# 7. Network Function Services and descriptions

Editor’s Note: TBD, this clause is a placeholder for any necessary new Services to be defined in this TS.

Annex A (Informative):  
EAS discovery using 3rd party DNS server

Editor's Note: This is to address the case that operator's DNS setting is overrided by user/application and 3rd party DNS/DoH server is used. sol #14-like solution in TR.

Annex B (Informative):  
Application layer based EAS (re-)discovery

Editor's Note: This is to address application layer based EAS rediscovery procedure as concluded in 9.2.3 in TR.

Annex C (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
|  |  |  |  |  |  |  |  |