ETSI TS 129 524 V15.1.0 (2019-04)

5G;
5G System;
Cause code mapping between 5GC interfaces;
Stage 3
(3GPP TS 29.524 version 15.1.0 Release 15)

Reference

RTS/TSGC-0429524vf10

Keywords

5G

ETSI

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Contents

Foreword

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1 Scope

The present document specifies the mapping:

- performed by the AMF between HTTP responses (Status Codes and Protocol or Application Errors) returned by 5GC NFs to the AMF and 5GMM Cause values sent to UEs;
- performed by the SMF between HTTP responses (Status Codes and Protocol or Application Errors) returned by 5GC NFs to SMF and 5GSM Cause values sent to UEs;
- performed by the SMF between N4 errors returned by the UPF and 5GSM Cause values sent to UEs.

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

[2] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes".

[3] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[4] 3GPP TS 29.531: "5G System; Network Slice Selection Services; Stage 3".

[5] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[6] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[7] 3GPP TS 29.509: "5G System; Authentication Server Services; Stage 3".

[8] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

[9] 3GPP TS 29.508: "5G System, Session Management Event Exposure Service; Stage 3".

[10] 3GPP TS 29.540: "5G System; SMS Services; Stage3 ".

[11] 3GPP TS 29.511: "5G System; Equipment Identity Register Services; Stage 3".

3 Definitions, symbols and abbreviations

3.1 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].

5GC	5G Core Network
AMF	Access and Mobility Management Function
HTTP	Hypertext Transfer Protocol

NF	Network Function
NSSF	Network Slice Selection Function
PCF	Policy Control Function
SMF	Session Management Function
UDM	Unified Data Management

4 Mapping between 5GC interfaces causes and 5GMM Cause Codes by AMF

4.1 General

This clause defines the mapping performed by the AMF between HTTP responses (status codes and Protocol or Application Errors) returned by NF services contacted by the AMF and the5GMM cause values sent to UEs.

No mapping is requiredfor the Nsmsf_SMService_Activate, Nsmsf_SMService_Deactivate and Nsmsf_SMService_UplinkSMS operations described in 3GPP TS 29.540 [10].

4.2 Mapping between Nausf services causes and 5GMM causes

4.2.1 General

This subclause defines the mapping performed by the AMF between HTTP responses (status codes and Protocol or Application Errors) returned by AUSF services to the AMF and the 5GMM cause values sent to UEs.

4.2.2 Mapping between Nausf_UEAuthentication service causes on N12 and 5GMM causes

4.2.2.1. General

This subclause defines the mapping for the Nausf_UEAuthentication service (see 3GPP TS 29.509 [7]). It also contains the mapping in case of a 200 OK is returned but the Authentication has failed.

4.2.2.2 Mapping from HTTP to 5GMM causes values – Request rejected by AUSF

Table .4.2.2-1: Mapping from HTTP to 5GMM cause values – Request rejected by AUSF

HTTP status code on N12	Protocol or Application Error	5GMM cause to UE
403 Forbidden	SERVING_NETWORK_NOT_AUTHORIZED	Cause #11 – PLMN not allowed Cause #73 – Serving network not authorized Cause #12 – Tracking area not allowed Cause #15 – No suitable cells in tracking area (NOTE1)
	AUTHENTICATION_REJECTED	N/A (NOTE 2)
	INVALID_HN_PUBLIC_KEY_IDENTIFIER	N/A (NOTE 2)
	INVALID_HN_PUBLIC_KEY_IDENTIFIER	N/A (NOTE 2)
404 Not Found	CONTEXT_NOT_FOUND	N/A (NOTE 2)
	USER_NOT_FOUND	
504 Gateway Timeout	UPSTREAM_SERVER_ERROR	N/A (NOTE 2)
	NETWORK_FAILURE	N/A (NOTE 2)
500 Internal Server Error	AV_GENERATION_PROBLEM	N/A (NOTE 2)
501 Not Implemented	UNSUPPORTED_PROTECTION_SCHEME	N/A (NOTE 2)
NOTE 1: .One of these 5GMM causes may be used. NOTE 2: There is no corresponding mapping since the Authentication is rejected and the Authentication Reject message does not have a 5GMM cause.		

4.2.2.3 Mapping from HTTP to 5GMM cause values – Request accepted by AUSF

Table .4.2.2.3-1: Mapping from HTTP to 5GMM cause values – Request accepted by AUSF

HTTP status code on N12	Protocol or Application Error	5GMM cause to UE
200 OK	The "authResult" in "ConfirmationDataResponse" is set to "AUTHENTICATION_FAILURE" (see subclause 6.1.6.2.8 of 3GPP TS 29.509 [7]).	Cause #3 – Illegal UE
	The "authResult" in "EapSession" is set to "AUTHENTICATION_FAILURE" (see subclause 6.1.6.2.8 of 3GPP TS 29.509 [7]).	Cause #3 – Illegal UE

4.3 Mapping between Nsmf services causes and 5GMM causes

4.3.1 General

This subclause defines the mapping performed by the AMF between HTTP responses (status codes and Protocol or Application Errors) returned by SMF services to the AMF and the 5GMM cause values sent to UEs.

The AMF may invoke SMF service operations upon receipt of:

- 5GSM messages (e.g. PDU Session establishment request) piggybacked in 5GMM UL NAS TRANSPORT message;
- 5GMM Service Request or Registration Request messages, to establish the user-plane resources of a PDU session.

A 5GMM cause is defined in:

- the DL NAS TRANSPORT message;
- the PDU session reactivation result error cause IE of a REGISTRATION ACCEPT or SERVICE ACCEPT message;
- the REGISTRATION REJECT or SERVICE REJECT message.

The AMF shall support mapping the status code and/or Protocol or Application Error received from the SMF to a 5GMM cause code, where 3GPP TS 24.501 [3] requires a 5GMM Cause to be included in the 5GMM message sent to the UE.

NOTE: REGISTRATION REJECT and SERVICE REJECT messages are rejected only due to 5GMM-specific reasons, i.e. not for problems specific to session management.

4.3.2 Mapping between Nsmf_PDUSession service causes on N11 and 5GMM causes

4.3.2.1 General

This subclause defines the mapping for the Nsmf_PDUSession service (see 3GPP TS 29.502 [8]).

4.3.2.2 Mapping from HTTP to 5GMM Cause Values

Table 4.3.2.2-1: Mapping from HTTP to 5GMM cause values – Request rejected by SMF

HTTP status code on N11	Protocol or Application Error	5GMM cause to UE
200 OK	The upCnxState IE is set to DEACTIVATED and the Cause IE set to "INSUFFICIENT_UP_RESOURCES" (see subclause 5.2.2.3.2.2 of 3GPP TS 29.502 [8]) (NOTE 2)	#92 - Insufficient user-plane resources for the PDU session
403 Forbidden	OUT_OF_LADN_SERVICE_AREA	#43 - LADN not available
403 Forbidden	PRIORITIZED_SERVICES_ONLY	#28 - Restricted service area
404 Not Found	CONTEXT_NOT_FOUND	N/A (NOTE 1)
504 Gateway Timeout	NETWORK_FAILURE	N/A (NOTE 1)
NOTE 1: An N1 SM cause is included by the SMF in the HTTP error response in this case. NOTE 2: This corresponds to the scenario where NG-RAN cannot establish user plane resources during the activation of the User Plane connection of a PDU session.		