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**LTE;
Telecommunication management;
Fault Management (FM)
for mobile networks that include virtualized network functions;
Stage 2
(3GPP TS 28.517 version 17.0.0 Release 17)**



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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:

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 - 2 presented to TSG for approval;
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- 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.

Introduction

The present document is part of a TS-family covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management, as identified below:

TS 28.515 "Fault Management (FM) for mobile networks that include virtualized network functions; Requirements".

TS 28.516 "Fault Management (FM) for mobile networks that include virtualized network functions; Procedures".

TS 28.517 "Fault Management (FM) for mobile networks that include virtualized network functions; stage 2".

TS 28.518 "Fault Management (FM) for mobile networks that include virtualized network functions; Stage 3".

1 Scope

The present document is Fault Management stage 2 specification for mobile networks that include virtualized network functions which can be part of EPC or IMS.

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 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP); Information Service (IS)".
- [3] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP); Information Service (IS)".
- [4] 3GPP TS 28.515: "Telecommunication management; Fault Management (FM) for mobile networks that include virtualized network functions; Requirements".
- [5] ETSI GS NFV-IFA 008 (V2.1.1): "Network Functions Virtualisation (NFV); Management and Orchestration; Ve-Vnfm reference point – Interface and Information Model Specification".
- [6] 3GPP TS 28.500: "Telecommunication management; Management concept, architecture and requirements for mobile networks that include virtualized network functions".

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 in 3GPP TS 28.500 [6] 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] or in 3GPP TS 28.500 [6].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and in 3GPP TS 28.500 [6] 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] or in 3GPP TS 28.500 [6].

4 General descriptions

For VNF Fault Management stage 2 solution over Itf-N, the Alarm IRP IS is applicable. The overall architectural feature of Alarm IRP is specified in TS 32.111-2 [2]. The Alarm IRP IS defines the semantics of alarms and the interactions visible across the reference point in a protocol neutral way. It defines the semantics of the operations and

notifications visible in the Alarm IRP. It does not define the syntax or encoding of the operations, notifications and their parameters. For the purpose of notification, Notification IRP [3] is needed.

5 Information model definition

5.1 Itf-N

For Itf-N VNF alarm management, the IOCs defined by AlarmIRP which is specified in clause 5 of 3GPP TS 32.111-2 [2] shall be used.

5.2 Os-Ma-nfvo

None.

5.3 Ve-Vnfm-em

For Ve-Vnfm-em alarm management, the information elements and notifications which are specified in subclause 9.3 of IFA 008 [5] for VNF alarm management shall be used.

5.4 Ve-Vnfm-vnf

None.

5.5 Mapping rule for alarm information elements

5.5.1 For construction of notifyNewAlarm

The following table shows the rule on how to construct the various attributes of notifyNewAlarm (see clause 6.8.1 of TS 32.111-2 [2]).

The first column shows the notifyNewAlarm notification attributes.

The second column shows the "Attributes of the Alarm information element" (see clause 9.3.4.2 of [5]) used by AlarmNotification (see clause 9.3.2 of [5]) produced by VNFM.

Table 5.5.1: Mapping rule for notifyNewAlarm

NotifyNewAlarm attributes of TS 32.111-2 [2]	Attributes of Alarm information elements in AlarmNotification of [5]	Notes
objectClass		This and the next 3GPP defined attribute are used for the DN of an MOI (whose attribute vnflInstanceDList contains one vnflInstanceD).
objectInstance		See above
notificationId		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
eventTime	eventTime	
systemDN		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
notificationType		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
probableCause	probableCause	
perceivedSeverity	perceivedSeverity	
rootCauseIndicator	isRootCause	
alarmType	faultType	
specificProblem	faultDetails	
correlatedNotifications	correlatedAlarmId	
backedUpStatus		Not used
backUpObject		Not used
trendIndication		Not used
thresholdInfo		Not used
stateChangeDefinition		Not used
monitoredAttributes		Not used
proposedRepairActions		Not used
additionalText		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
additionalInformation	managedObjectId, vnfcid	This is a list of two elements (encoded as strings) separated by a semicolon. The first element is a string "vnflId:abc" where 'abc' is managedObjectId (of second column). The second element is a string "vnfcid:xyz" where xyz is the vnfcid (of second column).
alarmId	alarmId	

5.5.2 For construction of notifyClearedAlarm

The following table shows the rule on how to construct the various attributes of notifyClearedAlarm (see clause 6.8.3 of TS 32.111-2 [2]).

The first column shows the notifyClearedAlarm notification attributes.

The second column shows the "Attributes of the AlarmClearedNotification (see clause 9.3.3.3 of [5]) produced by VNFM.

Table 5.5.2: Mapping rule for notifyClearedAlarm

NotifyClearedAlarm attributes of TS 32.111-2 [2]	Attributes of Alarm information elements in AlarmNotification of [5]	Notes
objectClass		See Notes of Table 5.5.1
objectInstance		See Notes of Table 5.5.1
notificationId		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
eventTime	alarmClearedTime	
systemDN		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
notificationType		See entry in Table 6.8.3.2 of TS 32.111-2 [2]
probableCause		Use the probableCause of the related notifyNewAlarm
perceivedSeverity		Use the value 'cleared'.
alarmType		Use the alarmType of the related notifyNewAlarm.
correlated Notifications		See entry in Table 6.8.3.2 of TS 32.111-2 [2]
clearUserId		Not used.
clearSystemId		Not used
alarmId	alarmId	

5.5.3 For construction of notifyChangedAlarm

The following table shows the rule on how to construct the various attributes of notifyChangedAlarm (see clause 6.8.1 of TS 32.111-2 [2]).

The first column shows the notifyChangedAlarm notification attributes.

The second column shows the “Attributes of the Alarm information element” (see clause 9.3.4.2 of [5]) used by AlarmNotification (see clause 9.3.2 of [5]) produced by VNFM.

Table 5.5.3: Mapping rule for notifyChangedAlarm

NotifyChangedAlarm attributes of TS 32.111-2 [2]	Attributes of Alarm information elements in AlarmNotification of [5]	Notes
objectClass		See Notes of Table 5.5.1
objectInstance		See Notes of Table 5.5.1
notificationId		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
eventTime	alarmChangedTime	
systemDN		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
notificationType		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
probableCause	probableCause	
perceivedSeverity	perceivedSeverity	
alarmType	faultType	
alarmId	alarmId	

5.5.4 For construction of notifyAckStateChangedAlarm

The following table shows the rule on how to construct the various attributes of notifyAckStateChangedAlarm (see clause 6.8.2 of TS 32.111-2 [2]).

The first column shows the notifyAckStateChangedAlarm notification attributes.

The second column shows the “Attributes of the Alarm information element” (see clause 9.3.4.2 of [5]) used by AlarmNotification (see clause 9.3.2 of [5]) produced by VNFM.

Table 5.5.4: Mapping rule for notifyAckStateChangedAlarm

NotifyAckStateChangedAlarm attributes of [3]	Attributes of Alarm information elements in AlarmNotification of [2]	Notes
objectClass		See Notes of Table 5.5.1
objectInstance		See Notes of Table 5.5.1
notificationId		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
eventTime	eventTime	
systemDN		See above
notificationType		See entry in Table 6.8.1.2 of TS 32.111-2 [2]
probableCause	probableCause	
perceivedSeverity	perceivedSeverity	
alarmType	faultType	
alarmId	alarmId	
ackState	ackState	
ackUserId		
ackSystemId		

6 Interface definition

6.1 Itf-N

For Itf-N VNF alarm management, the operations and notifications defined by AlarmIRP which is specified in 3GPP TS 32.111-2 [2] shall be used.

6.2 Ve-Vnfm-em

For REQ-NFV_FM_Ve-Vnfm-em-FUN-1 specified in 3GPP TS 28.515 [4], the Notify operation specified in clause 7.5.3 of ETSI GS NFV-IFA 008 [5] shall be used.

For REQ-NFV_FM_Ve-Vnfm-em-FUN-2 specified in 3GPP TS 28.515 [4], the Notify operation specified in clause 7.5.3 of ETSI GS NFV-IFA 008 [5] shall be used.

For REQ-NFV_FM_Ve-Vnfm-em-FUN-3 specified in 3GPP TS 28.515 [4], the Heal VNF operation specified in clause 7.2.10 of ETSI GS NFV-IFA 008 [5] shall be used.

For REQ-NFV_FM_Ve-Vnfm-em-FUN-4 specified in 3GPP TS 28.515 [4], the Subscribe operation specified in clause 7.5.2 of ETSI GS NFV-IFA 008 [5] shall be used.

Annex A (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-06	SA#76	SP-170505	0001	-	D	Update text in ltf-N interface clause to align with other clauses	14.1.0
2018-06	SA#80	SP-180417	0002	1	B	Scope extension to cover RAN	15.0.0
2020-07	-	-	-	-	-	Update to Rel-16 version (MCC)	16.0.0
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