

ETSI TS 128 521 V18.0.0 (2024-05)



**LTE;
Telecommunication management;
Performance Management (PM)
for mobile networks that include virtualized network functions;
Procedures
(3GPP TS 28.521 version 18.0.0 Release 18)**



Reference

RTS/TSGS-0528521 vi00

Keywords

LTE

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from:

<https://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

If you find a security vulnerability in the present document, please report it through our
Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2024.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under <https://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	4
Introduction	4
1 Scope	5
2 References	5
3 Definitions and abbreviations.....	5
3.1 Definitions	5
3.2 Abbreviations	6
4 Performance Management procedures	6
4.1 Introduction	6
4.2 Threshold creation for monitoring the 3GPP NF performance measurements related to VR	6
4.3 VNF PM data related to VR job creation procedure	7
4.4 VNF PM data related to VR subscription procedure.....	8
4.5 VNF PM data related to VR available notification procedure.....	8
4.6 PM job deletion for VNF/VNFC performance measurements related to VR.....	9
4.7 Measurement job suspension for 3GPP NF performance measurements related to VR.....	9
4.8 Measurement job resumption for 3GPP NF performance measurements related to VR	9
4.9 Performance alarm notification procedure for NF performance measurements related to VR	10
Annex A (informative): Change history	12
History	13

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.

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 28.520: Telecommunication management; Performance Management (PM) for mobile networks that include virtualized network functions; Requirements.
- TS 28.521: Telecommunication management; Performance Management (PM) for mobile networks that include virtualized network functions; Procedures.**
- TS 28.522: Telecommunication management; Performance Management (PM) for mobile networks that include virtualized network functions; Stage 2.
- TS 28.523: Telecommunication management; Performance Management (PM) for mobile networks that include virtualized network functions; Stage 3.

1 Scope

The present document specifies the Performance Management procedures for mobile networks that include virtualized network functions S.

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 32.412: "Telecommunication management; Performance Management (PM) Integration Reference Point (IRP); Information Service (IS)".
- [3] ETSI GS NFV-IFA008 V2.1.1 (2016-10): "Network Function Virtualization (NFV); Management and Orchestration; Ve-Vnfm Reference Point - Interface and Information Model Specification".
- [4] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM) Notification Integration Reference Point (IRP); Information Service (IS)".
- [5] 3GPP TS 32.342: "Telecommunication management; File Transfer (FT) Integration Reference Point (IRP); Information Service (IS)".
- [6] 3GPP TS 32.426: "Telecommunication management; Performance Management (PM); Performance measurements Evolved Packet Core (EPC) network".
- [7] 3GPP TS 28.500: "Telecommunication 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], in 3GPP TS 28.500 [7] 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 [7].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1], in 3GPP TS 28.500 [3] 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 [7].

4 Performance Management procedures

4.1 Introduction

The procedures listed in clause 4, as some of all the possibilities, are not exhaustive.

4.2 Threshold creation for monitoring the 3GPP NF performance measurements related to VR

Figure 4.2-1 depicts a procedure that describes how the 3GPP NF performance measurements related VR threshold crossing notification is generated. If the threshold is created to monitor a performance measurement directly without association with a PM job, then step 1 to 4 are not needed:

1. NM sends a request to EM to create a measurement job (see clause 7.3.1 of [2]) to collect the 3GPP NF performance measurements related VR. The job is defined by the parameters, such as `iOCName` and `iOCInstanceList` ... etc. as listed in clause 7.3.1.2 of [2].
2. EM sends a request with `sourceSelector`, `performanceMetric`, `performanceMetricGroup`, `collectionPeriod`, `reportingPeriod`, `reportingBoundary` (see clause 7.6.2.2 of [3]), to VNFM to create a PM job to collect VNF/VNFC PM data related to VR.
3. VNFM sends a response with `pmJobId` (see clause 7.6.2.3 of [3]) to EM to indicate the PM job that has been created.
4. EM sends a response to NM with `jobId` that is mapped from `pmJobId`, and `status = Success` (see clause 7.3.1.3 of [2]).
5. NM sends a request to EM to create thresholds (see clause 7.4.1 of [2]) that are defined by parameters, such as `iOCName`, `iOCInstanceList`, and `thresholdInfoList` (see clause 7.4.1.2 of [2]) to monitor the 3GPP NF performance measurements related VR.
6. EM sends a request to VNFM with `sourceSelector`, `performanceMetric`, `thresholdType`, `thresholdDetails` (see clause 7.6.7.2 of [3]), to create the thresholds for monitoring the measurement types specified in `sourceSelector`.
7. VNFM sends a response to EM with `thresholdId` (see clause 7.6.7.3 of [3]) to indicate the identifiers of thresholds that have been created.
8. EM sends a response to NM with `monitorId`, and `status = Success` (see clause 7.4.1.3 of [2]).
9. NM sends a request to EM to subscribe the 3GPP NF performance measurements related VR threshold crossing notification (see clause 6.3.1 of [4]).
10. EM sends a request with `filter` (see clause 7.6.4.2 of [3]) to VNFM to subscribe the VNF/VNFC performance information related VR threshold crossing notification.
11. VNFM sends a response with `subscriptionId` (see clause 7.6.4.3 of [3]) to EM to indicate the notification subscription that has been subscribed.
12. EM sends a response to NM to indicate that the 3GPP NF performance measurements related VR threshold crossing notification has been subscribed (see clause 6.3.1 of [4]).

13. VNFM sends a notification with `thresholdId`, `crossingDirection`, `objectInstanceId`, `performanceMetric`, `performanceValue` (see clause 9.7.9.3 of [3]) to EM to indicate the threshold identified by `objectInstanceId` has been crossed.
14. EM sends a notification with the object instance ID to NM to indicate that the threshold identified by object instance has been crossed.

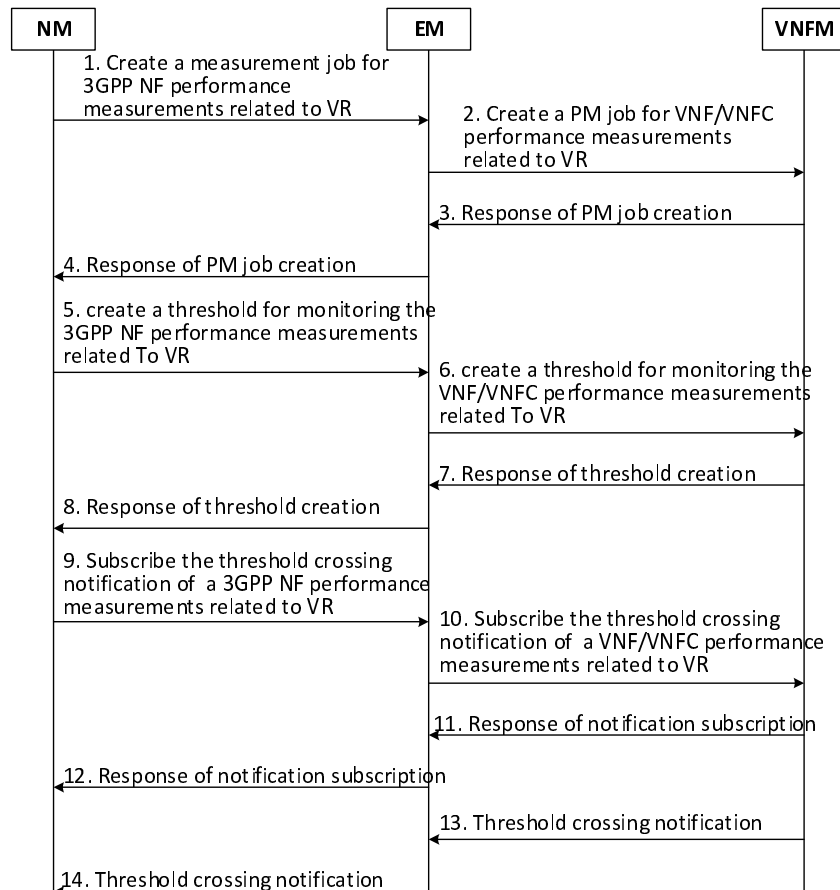


Figure 4.2-1: 3GPP NF performance measurements related VR threshold crossing notification procedure

4.3 VNF PM data related to VR job creation procedure

Figure 4.3-1 depicts a procedure that describes how VNF PM data related to VR job is created:

- EM sends a *CreatePmJobRequest* to VNFM with the following parameters (see clause 7.6.2.2 of [3]) to create a PM job:
 - `sourceSelector`: It identifies the VNF/VNFC for which the PM data is to be collected.
 - `performanceMetric` or `performanceMetricGroup`: It defines the type of performance metric(s), or the group of performance metric(s). Only one of the two is present.
 - `collectionPeriod`: it specifies the periodicity at which the VNFM will collect performance information.
 - `reportingPeriod`: It specifies the periodicity at which the VNFM will report to the EM about performance information,
 - `reportingBoundary`: It identifies a boundary after which the reporting will stop, and is optional.

2. VNFM sends a *CreatePmJobResponse* to EM with `pmJobId` (see clause 7.6.2.3 of [3]) to indicate the PM job that has been created.

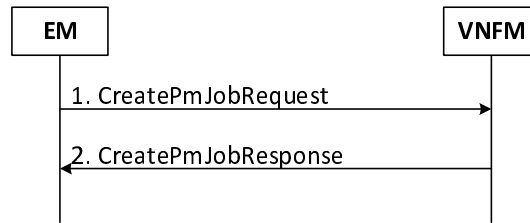


Figure 4.3-1: VNF PM data related to VR job creation procedure

4.4 VNF PM data related to VR subscription procedure

Figure 4.4-1 depicts a procedure that describes how to create a subscription to monitor VNF PM data related to VR:

1. EM sends a *SubscribeRequest* to VNFM with `filter` (see clause 7.6.4.2 of [3]) to subscribe the VNF PM data related to VR available notification.
2. VNFM sends a *SubscribeResponse* to EM with `subscriptionId` (see clause 7.6.4.3 of [3]) to indicate the notification subscription that has been subscribed.

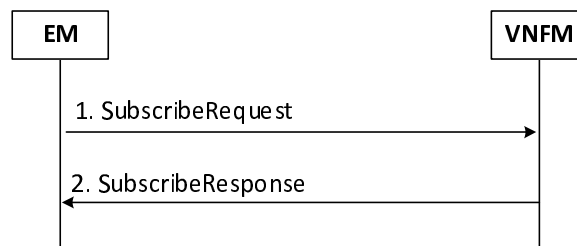


Figure 4.4-1: subscription for VNF PM data related to VR procedure

4.5 VNF PM data related to VR available notification procedure

Figure 4.5-1 depicts a procedure that describes how VNF PM data related to VR available notification is generated. EM has subscribed to receive the notification from VNFM. NM has subscribed to receive the notification from EM:

1. VNFM invokes an operation called *Notify* (see clause 7.6.5 of [3]) to send a *PerformanceInformationAvailableNotification* to EM (see clause 9.7.8 of [3]) with `objectInstanceId`, the identifier of the VNF or VNFC instances (see clause 9.7.8.3 of [3]), to indicate the VNF PM data related to VR identified by `objectInstanceId` is available.
2. EM invokes a notification called *notifyFileReady* (see clause 6.5.1 of [5]) to NM with `object instance IDs` to indicate that the VNF PM data related to VR identified by object instance ID is available.

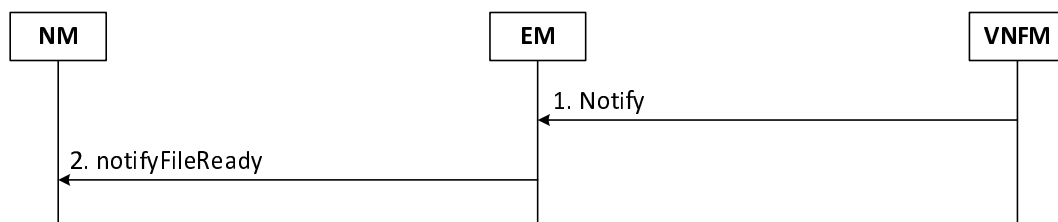


Figure 4.5-1: VNF PM data related to VR available notification procedure

4.6 PM job deletion for VNF/VNFC performance measurements related to VR

Figure 4.6-1 depicts a procedure PM job deletion for VNF/VNFC performance measurements related to VR.

1. EM sends a *DeletePmJobRequest* to VNFM with the `pmJobId` (see clause 7.4.3.2 of [3]) to identify the PM jobs to be deleted.
2. VNFM sends a *DeletePmJobResponse* to EM with `deletedPmJobId` (see clause 7.4.3.3 of [3]) to identify the PM jobs that have been deleted.

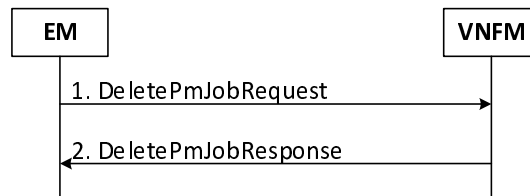


Figure 4.6-1: PM job deletion for VNF/VNFC performance measurements related to VR

4.7 Measurement job suspension for 3GPP NF performance measurements related to VR

Figure 4.7-1 depicts a procedure on measurement job suspension for 3GPP NF performance measurements related to VR:

1. NM invokes the `suspendMeasurementJob` operation (see clause 7.3.3 of [2]) with `jobId` to request EM to suspend the measurement job for 3GPP NF performance measurements related to VR.
2. EM stops the reporting of the measurement result data for the measurement job identified by the `jobId`.
3. EM responds the `suspendMeasurementJob` operation (see clause 7.3.1 of [2]) to NM with the result of the measurement job suspension.

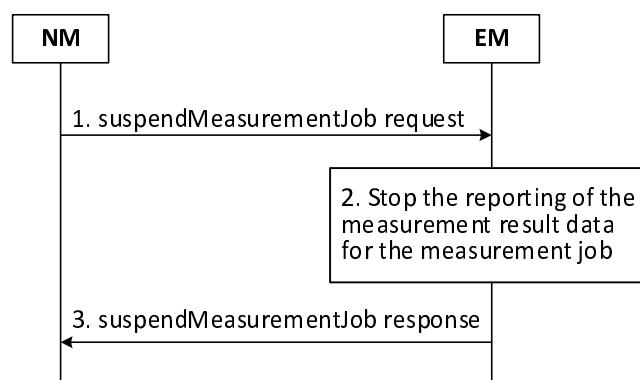


Figure 4.7-1: Measurement job suspension for 3GPP NF performance measurements related to VR

4.8 Measurement job resumption for 3GPP NF performance measurements related to VR

Figure 4.8-1 depicts a procedure on measurement job resumption for 3GPP NF performance measurements related to VR:

1. NM invokes the `resumeMeasurementJob` operation (see clause 7.3.3 of [2]) with `jobId` to request EM to resume the measurement job for 3GPP NF performance measurements related to VR.

2. If the PM jobs used to support the measurement job identified by the `jobId` do not exist anymore, EM requests VNFM to create the PM job(s), according to the procedure defined in clause 4.3.
3. EM resumes the reporting of the measurement result data for the measurement job identified by the `jobId`.
4. EM responds the `resumeMeasurementJob` operation (see clause 7.3.1 of [2]) to NM with the result of the measurement job resumption.

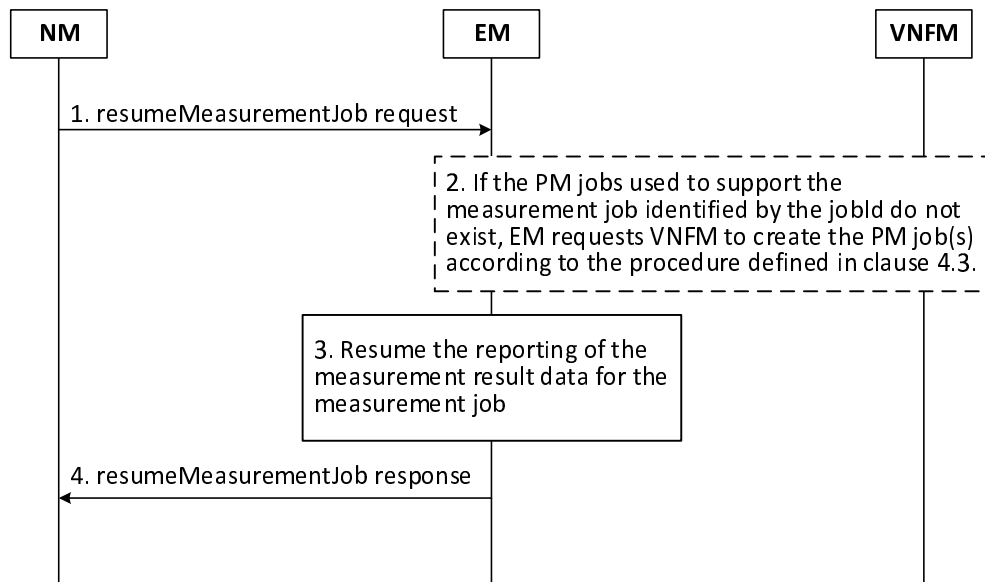


Figure 4.8-1: Measurement job resumption for 3GPP NF performance measurements related to VR

4.9 Performance alarm notification procedure for NF performance measurements related to VR

Figure 4.9-1 depicts a procedure that describes how EM can generate a performance alarm when threshold crossing notifications are received from VNFM. It is assumed that EM has subscribed to receive the threshold crossing notification from VNFM:

1. VNFM sends a *ThresholdCrossedNotification* with the following parameters (see clause 9.7.9.3 of [3]) to EM to indicate the threshold that has been crossed:
 - `thresholdId`: identifies the threshold which has been crossed.
 - `crossingDirection`: indicates whether the threshold was crossed in upward or downward direction.
 - `objectInstanceId`: identifies the VNF or VNFC instance for which the threshold has been crossed.
 - `performanceMetric`: indicates the performance metric associated with the threshold.
 - `performanceValue`: indicates the value of the metric that resulted in threshold crossing.
2. EM maps the `performanceValue` to the performance measurements for 3GPP NF related to VR, and determines whether or which alarm notification (i.e., `notifyNewAlarm`, `notifyChangedAlarm` or `notifyClearedAlarm` for the measurements defined in TS 32.426 [6]) should be sent to NM (see Annex B in [2]), based on the `ThresholdMonitor` created by NM (see clause 7.4.1.1 in [2]).

Note: How EM to perform mapping depends on the definition/specification of "performance measurements for 3GPP NF related to VR" and of `performanceMetric`, which are not defined in the present specification.

3. If an alarm needs to be generated:
 - 3.1. EM saves the performance alarm to the `AlarmList`.

- 3.2.a. If the performance alarm is a new alarm, then EM sends a *notifyNewAlarm* notification to NM.
- 3.2.b. If the performance alarm is a changed alarm, then EM sends to NM either a *notifyChangedAlarm* notification, or *notifyClearedAlarm* follow by a *notifyNewAlarm* notifications if *notifyChangedAlarm* is not supported.
- 3.2.c. If the performance alarm is a cleared alarm, then EM sends a *notifyClearedAlarm* notification to NM.

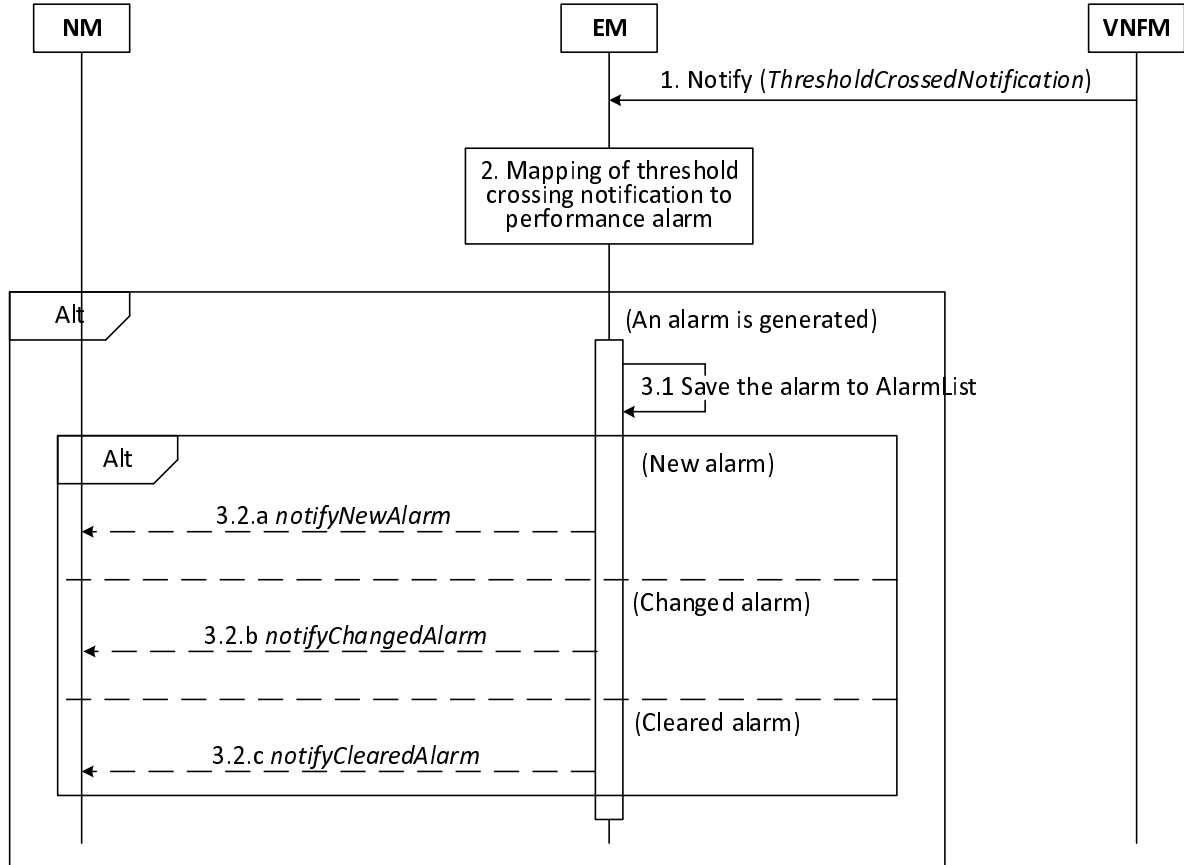


Figure 4.9-1: Performance alarm notification procedure for NF performance measurements related to VR

Annex A (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-06	SA#76					Upgraded to change control version	14.0.0
2017-06	SA#80	SP-180417	0001	1	B	Scope extension to cover RAN	15.0.0
2020-07	-	-	-	-	-	Update to Rel-16 version (MCC)	16.0.0
2022-03	-	-	-	-	-	Update to Rel-17 version (MCC)	17.0.0
2024-04	-	-	-	-	-	Update to Rel-18 version (MCC)	18.0.0

History

Document history		
V18.0.0	May 2024	Publication