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Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;  
Telecommunication management;

Wireless Local Area Network (WLAN) management;

Concepts and requirements

(Release 16)

 

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# Foreword

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

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where:

x the first digit:

1 presented to TSG for information;

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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 28.680: Telecommunication management; Wireless Local Area Network (WLAN) management; Concepts and requirements**

TS 28.681: Telecommunication management; Wireless Local Area Network (WLAN) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements.

TS 28.682: Telecommunication management; Wireless Local Area Network (WLAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS).

TS 28.683: Telecommunication management; Wireless Local Area Network (WLAN) Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions.

# 1 Scope

The present document describes the concepts and requirements of WLAN management that focus on WLAN performance monitoring and alarm notifications.

# 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 32.101: "Telecommunication management; Principles and high level requirements".

[3] 3GPP TS 32.150: "Telecommunication management; IRP Concept and definitions".

[4] IETF RFC 2863: "The Interfaces Group MIB".

[5] 3GPP TS 32.111-2: "Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".

[6] IETF RFC 3877: "Alarm Management Information Base (MIB)", September, 2004.

[7] 3GPP TS 32.102: "Telecommunication management; Architecture".

# 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], 3GPP TS 32.101 [2], 3GPP TS 32.102 [7], and 3GPP TS 32.150 [3] 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].

## 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].

AC Access Controller

AP Access Point

IOC Information Object Class

IRP Integration Reference Point

NE Network Element

WLAN Wireless Local Access Network

# 4 Concepts and background

## 4.1 Overview

The architecture for management of WLAN AP is conformant to the Management reference model as defined in Figure 1 of TS 32.101 [2] where the WLAN AP is depicted as NE. The system context of the WLAN management is in compliance with the System Context A, defined in Figure 4.7.1 in TS 32.150 [3].

## 4.2 Mapping Function

Figure 4.2-1 provides an example of 3GPP – WLAN mapping function. The mapping function is to map the relevant management data produced by WLAN AP in a form suitable for distribution via the Type-2 interface to IRPManager(s). The mapping function is a logical function. Its location, as well as its internal and external interfaces, if any, are out the scope of 3GPP specification.



Figure 4.2-1: Example of 3GPP – WLAN Mapping Function

## 4.3 WLAN alarm notification

WLAN AP alarms can be generated from ifOperStatus (RFC 2863 [4]) object. The following examples extracted from RFC 3877 [6] shows that the WLAN AP embeds the ifOperStatus object in the linkUp/linkDown notifications to report the WLAN AP alarms.

**"6.1. Alarms Based on linkUp/linkDown Notifications**

linkDown NOTIFICATION-TYPE

OBJECTS { ifIndex, ifAdminStatus, ifOperStatus }

STATUS current

DESCRIPTION

""

::= { snmpTraps 3 }

linkUp NOTIFICATION-TYPE

OBJECTS { ifIndex, ifAdminStatus, ifOperStatus }

STATUS current

DESCRIPTION

""

::= { snmpTraps 4 }"

alarmModelIndex 3

alarmModelState 1

alarmModelNotificationId linkUp

alarmModelVarbindIndex 0

alarmModelVarbindValue 0

alarmModelDescription "linkUp"

alarmModelSpecificPointer ituAlarmEntry.3.1

alarmModelVarbindSubtree ifIndex (1.3.6.1.2.1.2.2.1.1)

alarmModelResourcePrefix 0.0

alarmModelRowStatus active (1)

ituAlarmEventType communicationsAlarm (2)

ituAlarmPerceivedSeverity cleared (1)

ituAlarmGenericModel alarmModelEntry.3.1

alarmModelIndex 3

alarmModelState 3

alarmModelNotificationId linkDown

alarmModelVarbindIndex 2

alarmModelVarbindValue up (1)

alarmModelDescription "linkDown - confirmed problem"

alarmModelSpecificPointer ituAlarmEntry.3.3

alarmModelVarbindSubtree ifIndex (1.3.6.1.2.1.2.2.1.1)

alarmModelResourcePrefix 0.0

alarmModelRowStatus active (1)

ituAlarmEventType communicationsAlarm (2)

ituAlarmPerceivedSeverity critical (3)

ituAlarmGenericModel alarmModelEntry.3.3"

WLAN AP will send a notification when ifOperStatus object changes its value. The value of ifOperStatus object is shown below (see RFC 2863 [4]).

ifOperStatus OBJECT-TYPE

SYNTAX INTEGER {

up(1), -- ready to pass packets

down(2),

testing(3), -- in some test mode

unknown(4), -- status can not be determined

-- for some reason.

dormant(5),

notPresent(6), -- some component is missing

lowerLayerDown(7) -- down due to state of

-- lower-layer interface(s)

}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The current operational state of the interface. The

testing(3) state indicates that no operational packets can

be passed. If ifAdminStatus is down(2) then ifOperStatus

should be down(2). If ifAdminStatus is changed to up(1)

then ifOperStatus should change to up(1) if the interface is

ready to transmit and receive network traffic; it should

change to dormant(5) if the interface is waiting for

external actions (such as a serial line waiting for an

incoming connection); it should remain in the down(2) state

if and only if there is a fault that prevents it from going

to the up(1) state; it should remain in the notPresent(6)

state if the interface has missing (typically, hardware)

components."

::= { ifEntry 8 }

The following tables show that IRPAgent, together with the mapping function will map the IETF alarm notification attributes for down(2) and up(1) to the 3GPP alarm parameters as defined in TS 32.111-2 [5]. For each table, it also includes the example of on what conditions the 3GPP alarm notification will be sent.

**1) notifyNewAlarm**

|  |  |  |  |
| --- | --- | --- | --- |
| IETF alarm notification attribute | Value | 3GPP AlarmInformation Attribute | Legal Value |
|  |  | objectClass | Carry the object class name of the IOC |
|  |  | objectInstance | Carrying the Distinguished Name (DN) of this object instance |
|  |  | notificationId | Carry the identifier for the notification |
| alarmActiveDateAndTime | DateAndTime  (It indicates the local date and time when the alarm occurred) | eventTime | Convey the same sematic as DateAndTime |
|  |  | systemDN | Carry either (1) the IRPAgent instance containing that Interface IRP instance, or (2) the DN of that particular Interface IRP instance responsible for the emission of the notification |
| alarmModelVarbindValue | down (2) | notificationType | "notifyNewAlarm" |
|  |  | probableCause | Communication Subsystem Failure |
| ituAlarmPerceivedSeverity | ituAlarmPerceivedSeverity  (It indicates the alarm severity as defined in ITU Recommendation X.733) | perceivedSeverity | Convey the same sematic as ituAlarmPerceivedSeverity |
| ituAlarmEventType | communicationsAlarm (2) | alarmType | "Communications Alarm " |
|  |  | specificProblem | Absent |
|  |  | correlatedNotifications | Absent |
|  |  | backedUpStatus | Absent |
|  |  | backUpObject | Absent |
|  |  | trendIndication | Absent |
|  |  | thresholdInfo | Absent |
|  |  | stateChangeDefinition | Absent |
|  |  | monitoredAttributes | Absent |
|  |  | proposedRepairActions | Absent |
|  |  | additionalText | Absent |
|  |  | additionalInformation | Absent |
|  |  | alarmId | Mapping function allocates the alarm ID |

It there exists no AlarmInformation [5] in AlarmList [5] corresponding to IETF alarm notification, and the IETF alarm notification is down (2), then the IRPAgent will send notifyNewAlarm to the IRPManager, who has a subscription with NotificationIRP.

**2) notifyChangedAlarm**

|  |  |  |  |
| --- | --- | --- | --- |
| IETF alarm notification attribute | Value | 3GPP AlarmInformation Attribute | Legal Value |
|  |  | objectClass | Carry the object class name of the IOC |
|  |  | objectInstance | Carrying the Distinguished Name (DN) of this object instance |
|  |  | notificationId | Carry the identifier for the notification |
| alarmActiveDateAndTime | DateAndTime  (It indicates the local date and time when the alarm occurred) | eventTime | Convey the same sematic as DateAndTime |
|  |  | systemDN | Carry either (1) the IRPAgent instance containing that Interface IRP instance, or (2) the DN of that particular Interface IRP instance responsible for the emission of the notification |
| alarmModelVarbindValue | down (2) | notificationType | "notifyChangedAlarm". |
|  |  | probableCause | Communication Subsystem Failure |
| ituAlarmPerceivedSeverity | See reference in ituAlarmPerceivedSeverity  (It indicates the alarm severity as defined in ITU Recommendation X.733) | perceivedSeverity | Convey the same sematic as ituAlarmPerceivedSeverity |
| ituAlarmEventType | See reference in communicationsAlarm (2) | alarmType | "Communications Alarm " |
|  |  | alarmId | Mapping function uses the alarm ID previously allocated |

It there exists an AlarmInformation [5] in AlarmList [5] corresponding to IETF alarm notification, and the IETF alarm severity ituAlarmPerceivedSeverity has been changed, then the IRPAgent will send notifyChangeedAlarm to the IRPManager, who has a subscription with NotificationIRP.

**3) notifyClearedAlarm**

|  |  |  |  |
| --- | --- | --- | --- |
| IETF alarm notification attribute | Value | 3GPP AlarmInformation Attribute | Legal Value |
|  |  | objectClass | Carry the object class name of the IOC |
|  |  | objectInstance | Carrying the Distinguished Name (DN) of this object instance |
|  |  | notificationId | Carry the identifier for the notification |
| alarmActiveDateAndTime | DateAndTime  (It indicates the local date and time when the alarm occurred) | eventTime | Convey the same sematic as DateAndTime |
|  |  | systemDN | Carry either (1) the IRPAgent instance containing that Interface IRP instance, or (2) the DN of that particular Interface IRP instance responsible for the emission of the notification |
| alarmModelVarbindValue | up (1) | notificationType | "notifyClearedAlarm". |
|  |  | probableCause | Communication Subsystem Failure |
| ituAlarmPerceivedSeverity | See reference in ituAlarmPerceivedSeverity  (It indicates the alarm severity as defined in ITU Recommendation X.733) | perceivedSeverity | “cleared” |
| ituAlarmEventType | See reference in communicationsAlarm (2) | alarmType | "Communications Alarm " |
|  |  | correlated Notifications | Absent |
|  |  | clearUserId | Absent |
|  |  | clearSystemId | Absent |
|  |  | alarmId | Mapping function uses the alarm ID previously allocated |

It there exists an AlarmInformation [5] in AlarmList [5] corresponding to IETF alarm notification, and the IETF alarm notification is up (1), then the IRPAgent will send notifyClearedAlarm to the IRPManager, who has a subscription with NotificationIRP.

# 5 Requirements

**REQ-WLAN\_NRM\_CON-001**

The NRM defined by this IRP shall contain WLAN specific classes and related definitions.

Annex A (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **TSG #** | **TSG Doc.** | **CR** | **Rev** | **Subject/Comment** | **Old** | **New** |
| 12-2015 | SA-70 | SP-150680 |  |  | Presented for approval | 1.1.0 | 2.0.0 |
|  |  |  | Upgrade to Rel-13 | 2.0.0 | 13.0.0 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2017-03 | SA#75 |  |  |  |  | Promotion to Release 14 without technical change | 14.0.0 |
| 2018-12 | - | - | - | - | - | Update to Rel-15 version (MCC) | 15.0.0 |
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