 O-RAN.WG3.E2AP-R003-v03.00

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Technical Specification

O-RAN Work Group 3 (WG-3)   
Near-Real-time RAN Intelligent Controller and E2 Interface

E2 Application Protocol (E2AP)

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# Foreword

This Technical Specification (TS) has been produced by O-RAN Alliance.

# 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 O-RAN Drafting Rules (Verbal forms for the expression of provisions).

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

# 1 Scope

The contents of the present document are subject to continuing work within O-RAN and may change following formal O-RAN approval. Should the O-RAN Alliance modify the contents of the present document, it will be re-released by O-RAN with an identifying change of release date and an increase in version number as follows:

Release x.y.z

where:

x the first digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc. (the initial approved document will have x=01).

y the second digit is incremented when editorial only changes have been incorporated in the document.

z the third digit included only in working versions of the document indicating incremental changes during the editing process.

The present document specifies the Near-RT RIC layer signalling protocol for the E2 interface.

The E2 interface provides means for interconnecting a Near-RT RIC and an E2 Node. The E2 Application Protocol (E2AP) supports the functions of E2 interface by signalling procedures defined in the present document. E2AP is developed in accordance to the general principles stated in O-RAN E2 General Aspects & Principles [2].

# 2 References

## 2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, O-RAN cannot guarantee their long term validity.

The following referenced documents are necessary for the application 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] O-RAN-WG3.E2GAP: “O-RAN Working Group 3 Near-Real-time RAN Intelligent Controller, E2 General Aspects and Principles”.

[3] O-RAN-WG3.E2SM: “O-RAN Working Group 3, Near-Real-time RAN Intelligent Controller, E2 Service Model (E2SM)”.

[4] ORAN-WG2.A1.GA&P: “O-RAN Working Group 2, A1 interface: General Aspects and Principles”.

[6] 3GPP TS 36.401: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture Description".

[7] 3GPP TS 38.401: "NG-RAN; Architecture description".

[8] 3GPP TS 36.420: “X2 general aspects and principles”.

[9] O-RAN-WG1.OAM Architecture: “O-RAN Operations and Maintenance Architecture”.

[10] 3GPP TS 38.410: “NG general aspects and principles”.

[11] 3GPP TS 38.420: “Xn general aspects and principles”.

[12] 3GPP TS 38.470: “F1 general aspects and principles”.

[13] 3GPP TS 36.410: “S1 general aspects and principles”.

[14] 3GPP TS 25.921: “Guidelines and principles for protocol description and error handling”.

[15] ITU-T Recommendation X.691 (07/2002): "Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)".

[16] ITU-T Recommendation X.680 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[17] ITU-T Recommendation X.681 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".

[18] 3GPP TS 38.300: “NR; NR and NG-RAN Overall Description; Stage 2”.

[19] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)"

[20] 3GPP TS 38.423: "NG-RAN; Xn application protocol (XnAP)"

[21] 3GPP TS 37.483: "E1 Application Protocol (E1AP)"

[22] 3GPP TS 38.473: "NG-RAN; F1 application protocol (F1AP)"

[23] 3GPP TS 37.473: "W1 interface; Application Protocol (W1AP)"

[24] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)"

[25] 3GPP TS 36.423: “Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 application protocol (X2AP)”

[26] IETF RFC 5905: “Network Time Protocol Version 4: Protocol and Algorithms Specification”

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, O-RAN cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

(void)

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms and definitions given in 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 TR 21.905 [1].

**A1**: Interface between non-RT RIC and Near-RT RIC to enable policy-driven guidance of Near-RT RIC applications/functions, and support AI/ML workflow [4].

**E2**: Interface connecting the Near-RT RIC and one or more O-CU-CPs, one or more O-CU-UPs, and one or more O-DUs [2].

**E2 Node**: a logical node terminating E2 interface. In this version of the specification, ORAN nodes terminating E2 interface are:

- for NR access: O-CU-CP, O-CU-UP, O-DU or any combination as defined in [9];

- for E-UTRA access: O-eNB.

**non-RT RIC (O-RAN non-real-time RAN Intelligent Controller)**: a logical function that enables non-real-time control and optimization of RAN elements and resources, AI/ML workflow including model training and updates, and policy-based guidance of applications/features in Near-RT RIC.

**Near-RT RIC (O-RAN near-real-time RAN Intelligent Controller)**: a logical function that enables near-real-time control and optimization of RAN elements and resources via fine-grained (e.g. UE basis, Cell basis) data collection and actions over E2 interface.

**O-CU**: (O-RAN Central Unit): a logical node hosting RRC, SDAP and PDCP protocols [7].

**O-CU-CP**: (O-RAN Central Unit – Control Plane): a logical node hosting the RRC and the control plane part of the PDCP protocol [7].

**O-CU-UP**: (O-RAN Central Unit – User Plane): a logical node hosting the user plane part of the PDCP protocol and the SDAP protocol [7].

**O-DU**: (O-RAN Distributed Unit): a logical node hosting RLC/MAC/High-PHY layers based on a lower layer functional split.

**O-eNB:** an eNB [6] or ng-eNB [18] that supports E2 interface.

**O-RU**: (O-RAN Radio Unit): a logical node hosting Low-PHY layer and RF processing based on a lower layer functional split. This is similar to 3GPP’s “TRP” or “RRH” but more specific in including the Low-PHY layer (FFT/iFFT, PRACH extraction).

**O1**: Interface between orchestration & management entities (Orchestration/NMS) and O-RAN managed elements, for operation and management, by which FCAPS management, Software management, File management and other similar functions shall be achieved.

**RAN Function**: A specific Function in a E2 Node; examples include termination of network interfaces (i.e. X2 [8], F1 [12], S1 [13], Xn [11], NGc [10]) and RAN internal functions handling UEs, Cells, etc.

**RIC Service**: A Service provided on an E2 Node to provide access to messages and measurements and / or enable control of the E2 Node from the Near-RT RIC.

## 3.2 Symbols

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

(void)

## 3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply.

Near-RT RIC near-real-time RAN Intelligent Controller

non-RT RIC non-real-time RAN Intelligent Controller:

O-CU O-RAN Central Unit

O-CU-CP O-RAN Central Unit – Control Plane

O-CU-UP O-RAN Central Unit – User Plane

O-DU O-RAN Distributed Unit

O-RU O-RAN Radio Unit

# 4 General

## 4.1 Procedure Specification Principles

The principle for specifying the procedure logic is to specify the functional behaviour of the terminating node exactly and completely. Any rule that specifies the behaviour of the originating node shall be possible to be verified with information that is visible within the system.

The following specification principles have been applied for the procedure text in clause 8:

- The procedure text discriminates between:

1) Functionality which "shall" be executed.

The procedure text indicates that the receiving node "shall" perform a certain function Y under a certain condition. If the receiving node supports procedure X but cannot perform functionality Y requested in the REQUEST message of a Class 1 EP, the receiving node shall respond with the message used to report unsuccessful outcome for this procedure, containing an appropriate cause value.

2) Functionality which "shall, if supported" be executed.

The procedure text indicates that the receiving node "shall, if supported," perform a certain function Y under a certain condition. If the receiving node supports procedure X, but does not support functionality Y, the receiving node shall proceed with the execution of the EP, possibly informing the requesting node about the not supported functionality.

- Any required inclusion of an optional IE in a response message is explicitly indicated in the procedure text. If the procedure text does not explicitly indicate that an optional IE shall be included in a response message, the optional IE shall not be included. For requirements on including *Criticality Diagnostics* IE, see clause 10.

## 4.2 Forwards and Backwards Compatibility

The forwards and backwards compatibility of the protocol is assured by mechanism where all current and future messages, and IEs or groups of related IEs, include ID and criticality fields that are coded in a standard format that will not be changed in the future. These parts can always be decoded regardless of the standard version.

## 4.3 Specification Notations

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

Procedure When referring to an elementary procedure in the specification the Procedure Name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. Handover Preparation procedure.

Message When referring to a message in the specification the MESSAGE NAME is written with all letters in upper case characters followed by the word "message", e.g. HANDOVER REQUEST message.

IE When referring to an information element (IE) in the specification the *Information Element Name* is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. *E-RAB ID* IE.

Value of an IE When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in the specification enclosed by quotation marks, e.g. "Value".

## 4.4 Identifiers

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

**E2 Node Component ID**: Local identifier used to uniquely identify an E2 Node component.

**Global E2 Node ID**: Global identifier of an E2 Node. Defined as the global eNB or gNB identifier and an optional local identifier of an CU-UP or DU which is required when and if an individual DU or CU-UP supports a direct E2 interface.

**Global RIC ID**: Global identifier of a Near-RT RIC.

**RAN Function ID**: Local identifier of a specific RAN Function within an E2 Node that supports one or more RIC Services using a specific E2 Service Model. Note that same E2SM may be used by more than one RAN Function in the same E2 Node.

**RAN Function OID**: RAN Function Object Identifier. Used to identify specific RAN function definition (i.e. E2SM used by specific RAN Function).

**RIC Action ID**: Local identifier used Near-RT RIC to identify a specific Action within a specific RIC Subscription Request, used by E2 Node in subsequent RIC Indication messages.

**RIC Call Process ID**: Local identifier used by E2 Node to identify the suspended associated procedure instance during a RIC Service “Insert”, used by Near-RT RIC in subsequent RIC Control procedure.

**RIC Request ID**: Local identifier used to identify a specific RIC Functional procedure among all ongoing parallel procedures of the same type initiated by the same protocol peer. Messages belonging to the same procedure use the same RIC Request ID. The RIC Request ID is determined by the initiating peer of a Near-RT RIC Functional Procedure.

- RIC Control procedure shall carry a unique RIC Request ID assigned by the Near-RT RIC

- RIC Subscription procedure shall carry a unique RIC Request ID assigned by the Near-RT RIC

- RIC Indication, RIC Subscription Modification, RIC Subscription Modification Required, RIC Subscription Delete and RIC Subscription Delete Required procedures shall use the same RIC Request ID as the corresponding RIC Subscription procedure

**Transaction ID**: Local identifier used to uniquely identify a Global Procedure among all ongoing parallel procedures of the same type initiated by the same protocol peer. Messages belonging to the same procedure use the same Transaction ID. The Transaction ID is determined by the initiating peer of a Global Procedure (Near-RT RIC or E2 Node).

# 5 E2AP Services

The present clause describes the services an E2 Node offers to the Near-RT RIC.

5.1 E2AP procedure modules

The E2 interface E2AP procedures are divided into two modules as follows:

1. E2AP Near-RT RIC Functional Procedures;

2. E2AP Global Procedures;

The E2AP Near-RT RIC functional procedures module contains procedures used to pass application specific messages between Near-RT RIC applications and a target function in an E2 node [2]

The Global Procedures module contains procedures that are not directly related to a specific application.

5.2 Parallel transactions

Parallel transactions, that is, multiple ongoing E2AP procedures related to the same Application and E2 node, are supported.

# 6 Services expected from Signalling Transport

The signalling connection shall provide in sequence delivery of E2AP messages. E2AP shall be notified if the signalling connection breaks.

# 7 Functions of E2AP

The functions of E2AP are described in O-RAN Working Group 3 Near-Real-time RAN Intelligent Controller, E2 General Aspects and Principles [2].

# 8 E2AP Procedures

## 8.1 Elementary Procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs.

**Table 8.1-1: Class 1 Elementary Procedures**

| **Initiated by** | **Elementary Procedure** | **Initiating Message** | **Successful Outcome** | **Unsuccessful Outcome** | |
| --- | --- | --- | --- | --- | --- |
| **Response message** | **Response message** | |
| Near-RT RIC | RIC Subscription | RIC SUBSCRIPTION REQUEST | RIC SUBSCRIPTION RESPONSE | RIC SUBSCRIPTION FAILURE |
| Near-RT RIC | RIC Subscription Delete | RIC SUBSCRIPTION DELETE REQUEST | RIC SUBSCRIPTION DELETE RESPONSE | RIC SUBSCRIPTION DELETE FAILURE |
| Near-RT RIC | RIC Subscription Modification | RIC SUBSCRIPTION MODIFICATION REQUEST | RIC SUBSCRIPTION MODIFICATION RESPONSE | RIC SUBSCRIPTION MODIFICATION FAILURE |
| E2 Node | RIC Subscription Modification Required | RIC SUBSCRIPTION MODIFICATION REQUIRED | RIC SUBSCRIPTION MODIFICATION CONFIRM | RIC SUBSCRIPTION MODIFICATION REFUSE |
| Near-RT RIC | RIC Control | RIC CONTROL REQUEST | RIC CONTROL ACKNOWLEDGE | RIC CONTROL FAILURE |
| Near-RT RIC | RIC Query | RIC QUERY REQUEST | RIC QUERY RESPONSE | RIC QUERY FAILURE |
| E2 Node | E2 Setup | E2 SETUP REQUEST | E2 SETUP RESPONSE | E2 SETUP FAILURE |
| E2 Node | RIC Service Update | RIC SERVICE UPDATE | RIC SERVICE UPDATE ACKNOWLEDGE | RIC SERVICE UPDATE FAILURE |
| E2 Node | E2 Node Configuration Update | E2 NODE CONFIGURATION UPDATE | E2 NODE CONFIGURATION UPDATE ACKNOWLEDGE | E2 NODE CONFIGURATION UPDATE FAILURE | | |
| Near-RT RIC | E2 Connection Update | E2 CONNECTION UPDATE | E2 CONNECTION UPDATE ACKNOWLEDGE | E2 CONNECTION UPDATE FAILURE |
| Near-RT RIC or E2 Node | Reset | RESET REQUEST | RESET RESPONSE |  |
| Near-RT RIC or E2 Node | E2 Removal | E2 REMOVAL REQUEST | E2 REMOVAL RESPONSE | E2 REMOVAL FAILURE |

**Table 8.1-2: Class 2 Elementary Procedures**

| **Initiated by** | **Elementary Procedure** | **Initiating Message** |
| --- | --- | --- |
| E2 Node | RIC Indication | RIC INDICATION |
| Near-RT RIC | RIC Service Query | RIC SERVICE QUERY |
| E2 Node | RIC Subscription Delete Required | RIC SUBSCRIPTION DELETE REQUIRED |
| E2 Node or Near-RT RIC | Error Indication | ERROR INDICATION |

## 8.2 Near-RT RIC Functional Procedures

### 8.2.1 RIC Subscription procedure

#### 8.2.1.1 General

This procedure is used to establish E2 subscriptions on E2 Node consisting of an event trigger and a sequence of actions, each with a corresponding subsequent action.

#### 8.2.1.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

near -> ran: RIC SUBSCRIPTION REQUEST

ran->near: RIC SUBSCRIPTION RESPONSE

@enduml

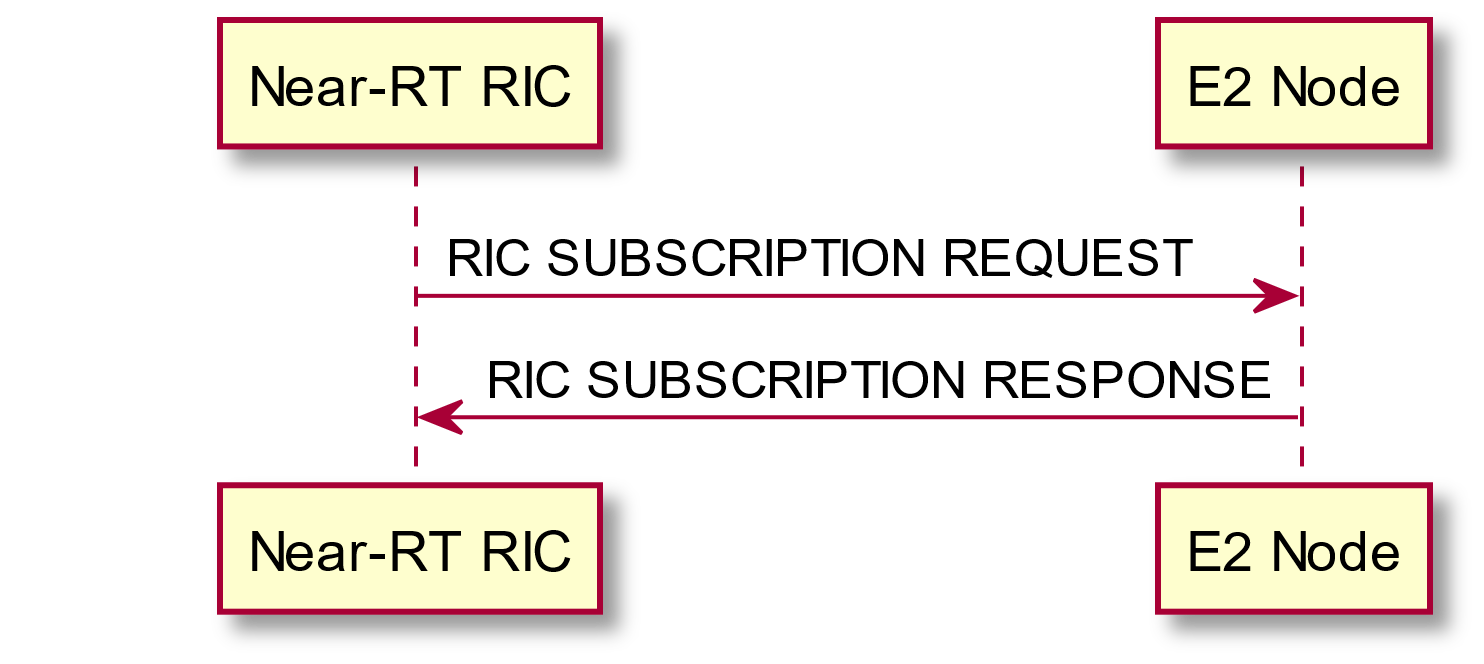


Figure 8.2.1.2-1: Near-RT RIC Subscription procedure, successful operation

The Near-RT RIC initiates the procedure by sending the RIC SUBSCRIPTION REQUEST message containing a unique *RIC Request ID* IE, assigned by the Near-RT RIC, to the target E2 Node. When the Near-RT RIC sends the RIC SUBSCRIPTION message, it shall start the timer TRICEVENTcreate.

At reception of the RIC SUBSCRIPTION REQUEST message the target E2 Node shall:

- Determine the target function using the information in the *RAN Function ID* IE and configure the requested event trigger using information in the *RIC Subscription Details* IE.

- If one or more **Report**, **Insert** and/or **Policy** RIC service actions are included in the *RIC Subscription Details* IE then the target function shall validate the event trigger and requested action sequence and, if accepted, store the required *RIC Request ID, RIC Event Trigger Definition* IE and sequence of RIC Actions.

- If optional *RIC Subscription Start Time* IE is present and has expired, then the E2 Node shall ignore the optional *RIC Subscription Start Time* IE.

If the requested trigger and at least one required action are accepted by the target E2 Node, the target E2 Node shall reserve necessary resources and send the RIC SUBSCRIPTION RESPONSE message back to the Near-RT RIC. The target E2 Node shall include in the response message the actions for which resources have been prepared at the target E2 Node in the *RIC Actions Admitted List* IE. The target E2 Node shall include the actions that have not been admitted in the *RIC Actions Not Admitted List* IE with an appropriate cause value.

Upon reception of the RIC SUBSCRIPTION RESPONSE message the Near-RT RIC shall stop the timer TRICEVENTcreate and terminate the Subscription Request procedure.

If more than one RIC service action has been accepted by the E2 Node then, at each occurrence of the common Event Trigger, the sequence of RIC service actions shall be executed according to the following considerations:

- If optional *RIC Action Execution Order* IE is not present or is present and set to 0 (“Any order”), then the specific RIC service action in the sequence of RIC service actions may be executed in any order irrespective of the execution order of the other RIC service actions.

- If optional *RIC Action Execution Order* IE is present and set to a value greater than 0, then the specific RIC service action shall be executed in order according to the *RIC Action Execution Order* IE.

- If two or more RIC service actions have the same value for the optional *RIC Action Execution Order* IE then these actions shall be executed in parallel.

If the optional *RIC Subscription Start Time* IE is present, the E2 Node shall only enable the event trigger from the indicated start time.

If the optional *RIC Subscription End Time* IE is present, the E2 Node shall disable the event trigger when the indicated end time has expired.

**Interactions with RIC Subscription Delete Required procedure:**

If the optional *RIC Subscription End Time* IE is present and the indicated end time has expired, the E2 Node may send the RIC SUBSCRIPTION DELETE REQUIRED message to the Near-RT RIC with an appropriate cause value.

**Interactions with RIC Subscription Delete procedure:**

If the optional *RIC Subscription End Time* IE is present, the Near-RT RIC may monitor the expected end time and initiate RIC Subscription Delete procedure when the indicated end time has expired.

In the event that the Near-RT RIC does not receive the optional RIC SUBSCRIPTION DELETE REQUIRED message AND also does not keep track of the expected end time, then the subscription will remain inactive on the E2 Node until otherwise deleted.

#### 8.2.1.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

near -> ran: RIC SUBSCRIPTION REQUEST

ran->near: RIC SUBSCRIPTION FAILURE

@enduml

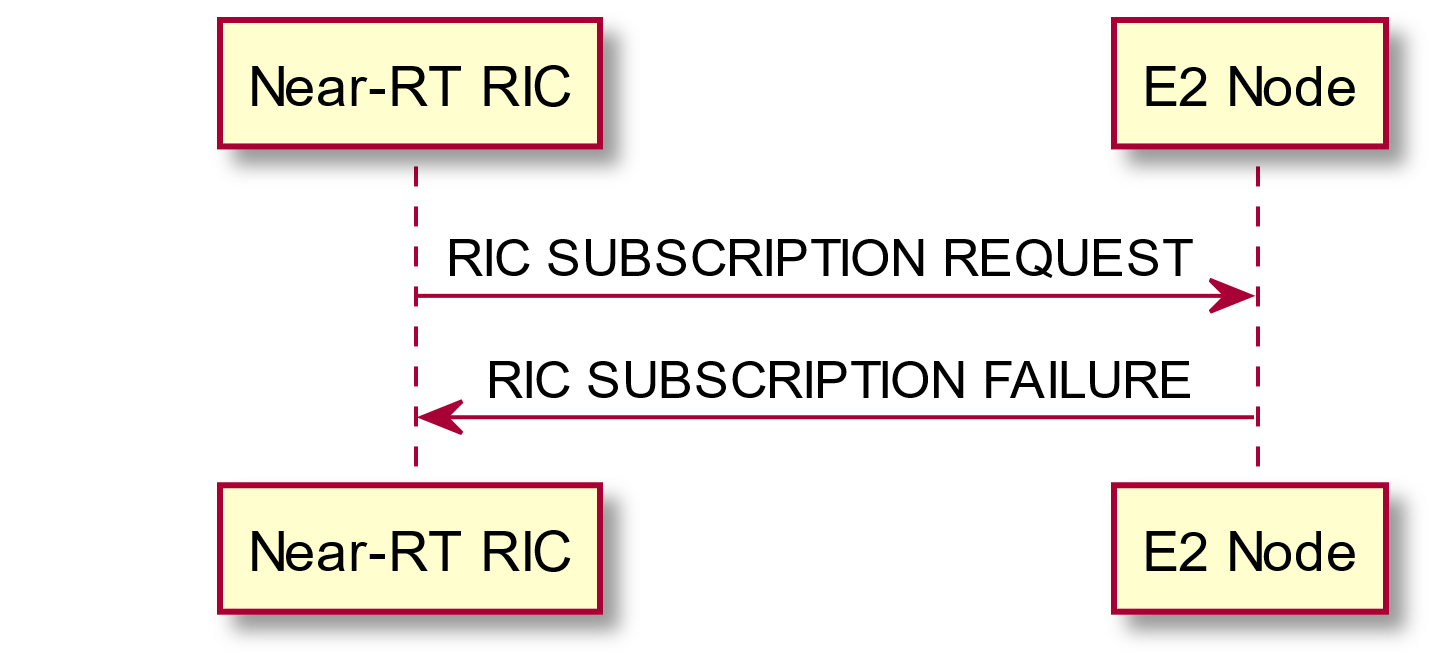


Figure 8.2.1.3-1: Near-RT RIC Subscription procedure, unsuccessful operation

If the target E2 Node does not admit at least one requested action, or detects an inconsistency in the sequence of actions or in the subsequent action definitions, or a failure occurs during the RIC Subscription procedure, or contains an invalid optional *RIC Subscription Start Time* IE and/or *RIC Subscription End Time* IE, the target E2 Node shall send the RIC SUBSCRIPTION FAILURE message to the Near-RT RIC with an appropriate cause value.

Upon reception of the RIC SUBSCRIPTION FAILURE message the Near-RT RIC shall stop the timer TRICEVENTcreate and terminate the RIC Subscription procedure.

**Interactions with RIC Subscription Delete procedure:**

If there is no response from the target E2 Node to the RIC SUBSCRIPTION REQUEST message before the timer TRICEVENTcreate expires in the Near-RT RIC, the Near-RT RIC shall cancel the RIC Subscription towards the target E2 Node by initiating the RIC Subscription Delete procedure with an appropriate cause value. The Near-RT RIC shall ignore any RIC SUBSCRIPTION RESPONSE or RIC SUBSCRIPTION FAILURE message received after the initiation of the RIC Subscription Delete procedure and remove any reference and release any resources related to the concerned E2 Node.

#### 8.2.1.4 Abnormal Conditions

If the target E2 Node receives a RIC SUBSCRIPTION REQUEST message containing *RIC Subscription Details* IE that does not align with the Near-RT RIC Service Model [3], the target E2 Node shall send the RIC SUBSCRIPTION FAILURE message to the Near-RT RIC with an appropriate cause value.

If the target E2 Node receives a RIC SUBSCRIPTION REQUEST message which contains a *RAN Function ID* IE that was not previously announced as a supported RAN function in the E2 Setup procedure or the RIC Service Update procedure, the target E2 Node shall send the RIC SUBSCRIPTION FAILURE message to the Near-RT RIC with an appropriate cause value.

If the target E2 Node receives a RIC SUBSCRIPTION REQUEST message containing identical contents, that is, same *RAN Function ID* IE, same *RIC Event Trigger Definition* IE and same sequence of actions, the target E2 Node shall send the RIC SUBSCRIPTION FAILURE message to the Near-RT RIC with an appropriate cause value.

### 8.2.2 RIC Subscription Delete procedure

#### 8.2.2.1 General

This procedure is used to delete E2 subscriptions on E2 Node.

#### 8.2.2.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

near -> ran: RIC SUBSCRIPTION DELETE REQUEST

ran->near: RIC SUBSCRIPTION DELETE RESPONSE

@enduml

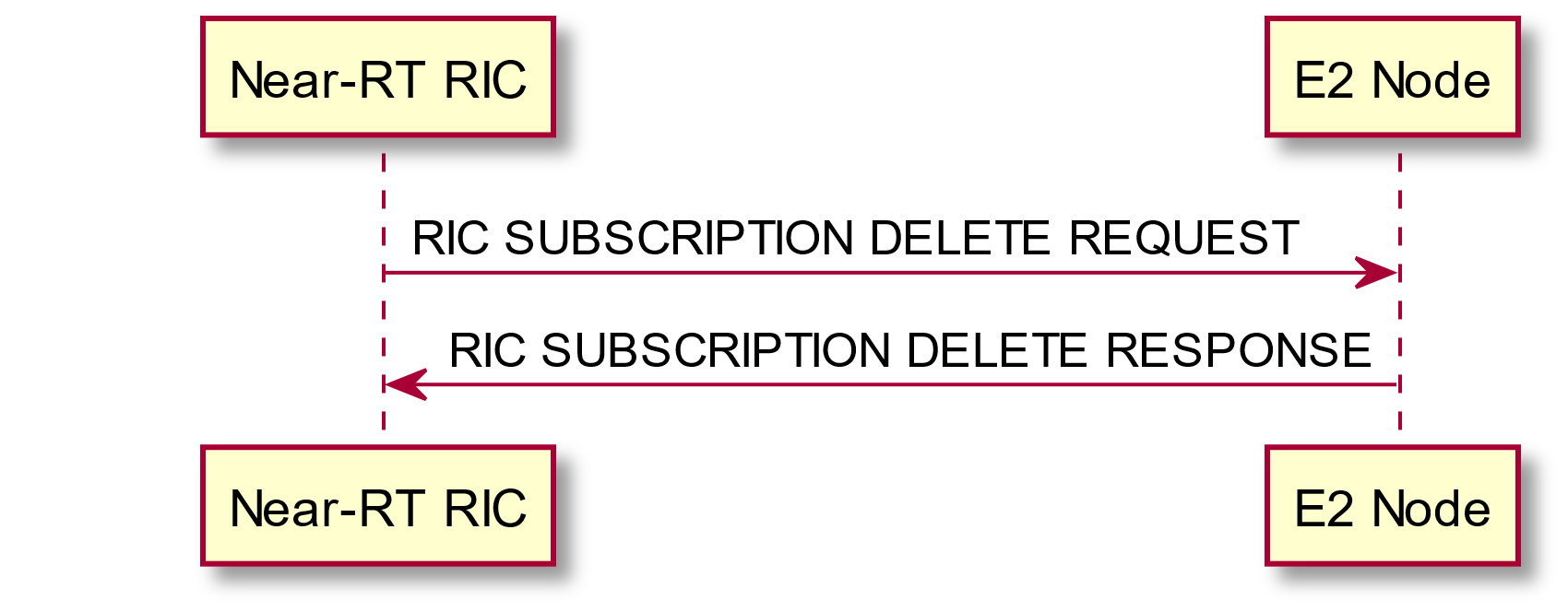


Figure 8.2.1.2-1: Near-RT RIC Subscription Delete procedure, successful operation

The Near-RT RIC initiates the procedure by sending the RIC SUBSCRIPTION DELETE REQUEST message, containing *RIC Request ID* IE that was previously assigned by the Near-RT RIC during a successful RIC Subscription procedure, to the target E2 Node. When the Near-RT RIC sends the RIC SUBSCRIPTION DELETE REQUEST message, it shall start the timer TRICEVENTdelete.

At reception of the RIC SUBSCRIPTION DELETE REQUEST message the target E2 Node shall:

- Determine the target function using the information in the *RAN Function ID* IE and delete the corresponding RIC EVENT trigger using information in the *RIC Request ID* IE.

- If one or more subsequent actions were included in the previously received RIC Subscription, then the target function shall delete the required actions along with the corresponding *RIC Request ID* IE.

The target E2 Node shall release necessary resources and send the RIC SUBSCRIPTION DELETE RESPONSE message back to the Near-RT RIC.

Upon reception of the RIC SUBSCRIPTION DELETE RESPONSE message the Near-RT RIC shall stop the timer TRICEVENTdelete, and terminate the RIC Subscription Delete procedure.

#### 8.2.2.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

near -> ran: RIC SUBSCRIPTION DELETE REQUEST

ran->near: RIC SUBSCRIPTION DELETE FAILURE

@enduml

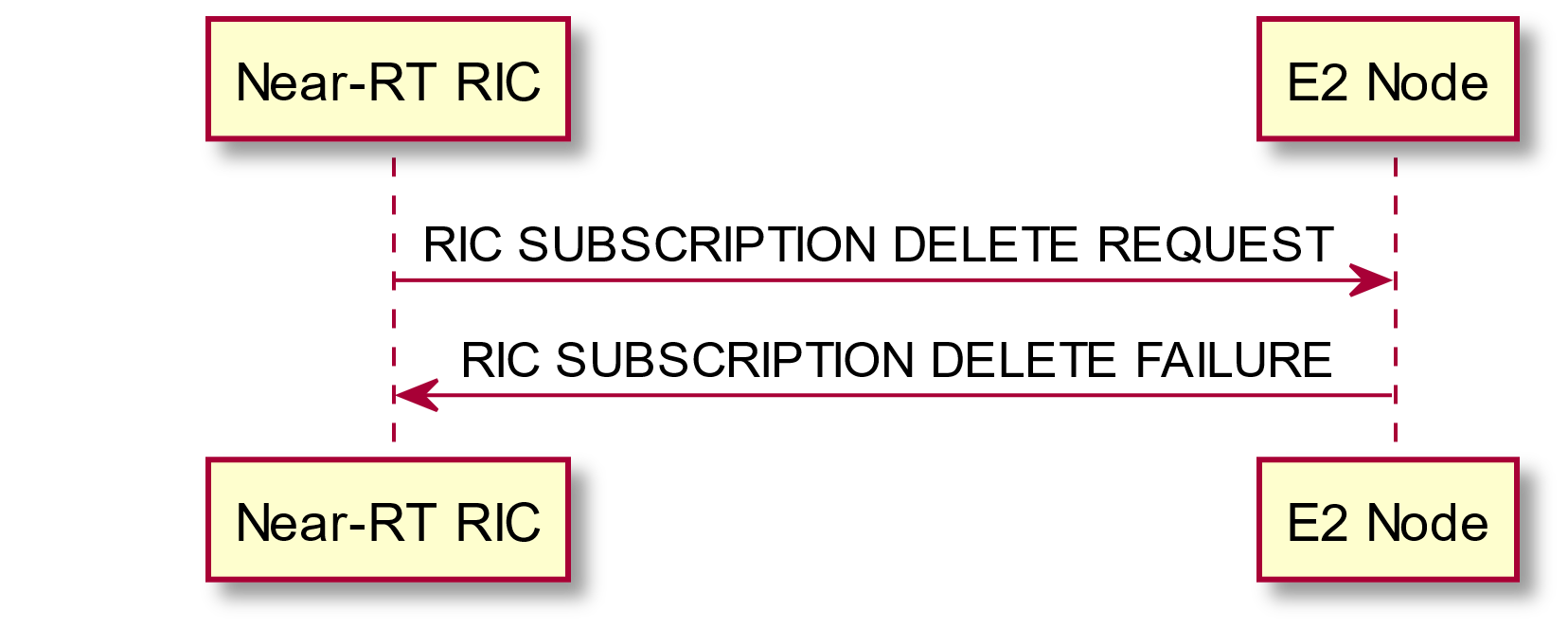


Figure 8.2.1.3-1: RIC Subscription Delete procedure, unsuccessful operation

If the target E2 Node has no stored subscription for the same *RIC Request ID* IE included in the RIC SUBSCRIPTION DELETE REQUEST message, or a failure occurs during the RIC Subscription Delete procedure, the target E2 Node shall send the RIC SUBSCRIPTION DELETE FAILURE message to the Near-RT RIC. The message shall contain with an appropriate cause value.

Upon reception of the RIC SUBSCRIPTION DELETE FAILURE message the Near-RT RIC shall stop the timer TRICEVENTdelete, and terminate the RIC Subscription Delete procedure.

#### 8.2.2.4 Abnormal Conditions

If the target E2 Node receives a RIC SUBSCRIPTION DELETE REQUEST message containing a *RIC Request ID* IE that is not known, the target E2 Node shall send the RIC SUBSCRIPTION DELETE FAILURE message to the Near-RT RIC. The message shall contain with an appropriate cause value.

If the target E2 Node receives a RIC SUBSCRIPTION DELETE REQUEST message contains a *RAN Function ID* IE that was not previously announced as a supported RAN function in the E2 Setup procedure or the RIC Service Update procedure, the target E2 Node shall send the RIC SUBSCRIPTION DELETE FAILURE message to the Near-RT RIC. The message shall contain with an appropriate cause value.

### 8.2.2A RIC Subscription Delete Required procedure

#### 8.2.2A.1 General

This procedure is used to enable the E2 Node to request deletion of the existing RIC Subscriptions in the E2 Node previously created for the Near-RT RIC.

#### 8.2.2A.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: RIC SUBSCRIPTION DELETE REQUIRED

near<-->ran: RIC Subscription Delete procedure

@enduml

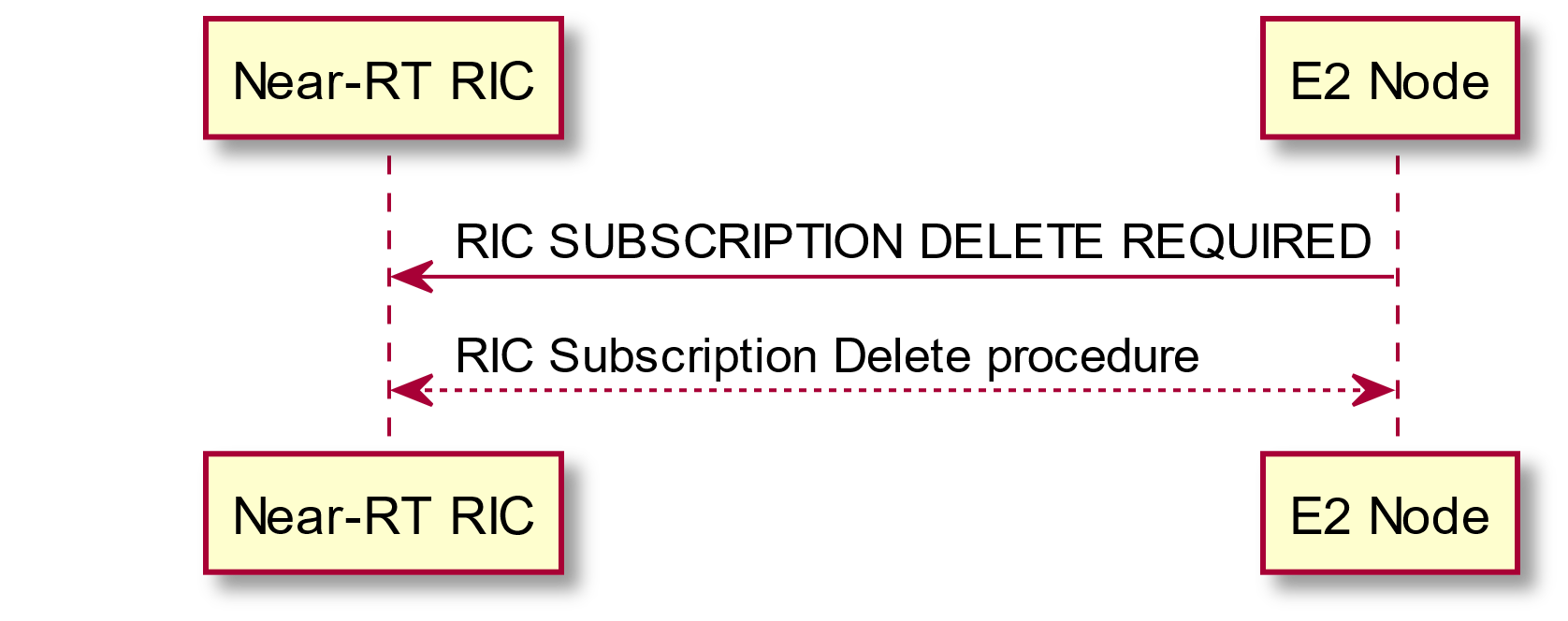


Figure 8.2.2A.2-1: Near-RT RIC Subscription Delete Required procedure, successful operation

The E2 Node initiates the procedure by sending the RIC SUBSCRIPTION DELTE REQUIRED message, containing *RIC Request ID* IE that was previously assigned by the Near-RT RIC during a successful RIC Subscription procedure, to the Near-RT RIC. The message shall contain an appropriate cause value for each RIC Subscription requesting to remove. The E2 Node shall not remove RIC Subscription(s) on its own until indicated by the Near-RT RIC to do so.

At reception of the RIC SUBSCRIPTION DELETE REQUIRED message, for each RIC Subscription associated with the included *RIC Request ID* IE and *RAN Function ID* IE, the Near-RT RIC may:

- Release necessary resources related to that RIC Subscription and initiate the RIC Subscription Delete procedure toward the E2 Node.

#### 8.2.2A.3 Abnormal Conditions

If the Near-RT RIC receives a RIC SUBSCRIPTION DELETE REQUIRED message for which the included *RIC Request ID* IE and *RAN Function ID* IE are not associated with the previously subscribed, the Near-RT RIC shall ignore the message.

### 8.2.3 RIC Indication procedure

#### 8.2.3.1 General

The purpose of the RIC Indication procedure is to transfer a message associated with a **Report** and/or **Insert** RIC Service to the Near-RT RIC corresponding to a previously successful RIC Subscription procedure and the corresponding detection of the Event Trigger.

#### 8.2.3.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: RIC INDICATION

@enduml

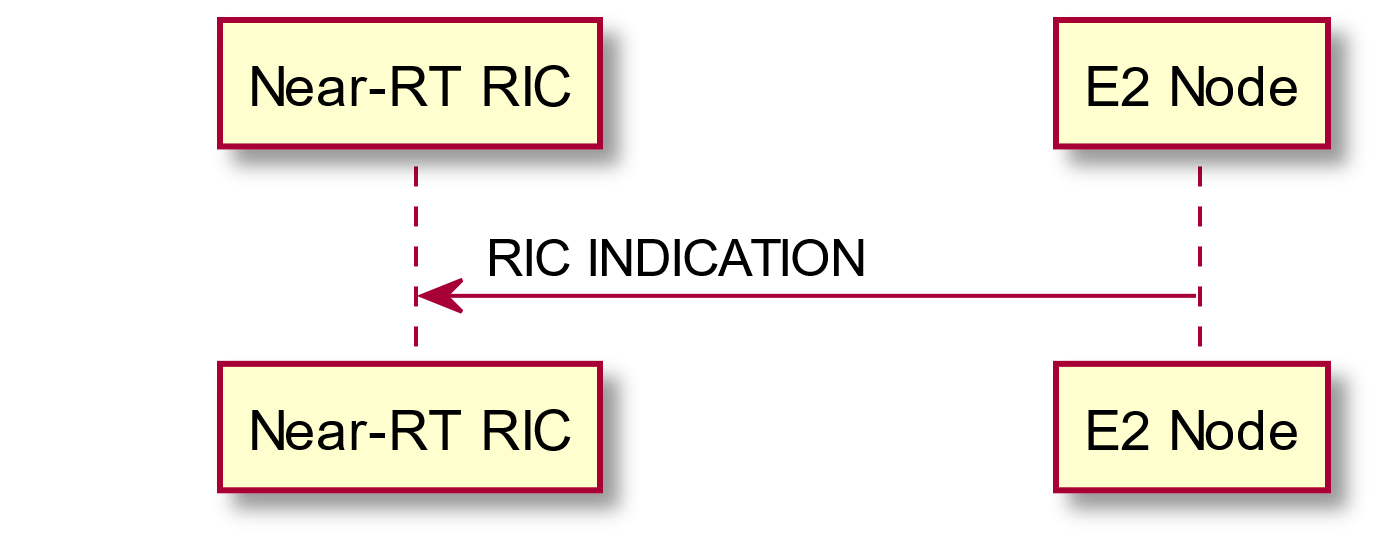


Figure 8.2.3.2-1: Near-RT RIC Indication procedure, successful operation

An E2 Node initiates the procedure by sending RIC INDICATION message containing the *RIC Request ID* IE, that was previously assigned by the Near-RT RIC during a successful RIC Subscription procedure, along with associated, *RAN Function ID* IE, *RIC Action ID* IE, optionally sequence number *RIC Indication SN* IE, *RIC Indication Type* IE, *RIC Indication Header* IE, *RIC Indication Message* IE and optionally a *RIC Call Process ID* IE, assigned by the E2 Node, to the Near-RT RIC.

- If the RIC Indication message is in response to RIC Subscription with *RIC Action Type* IE as "Insert", then the E2 Node shall provide the *RIC Call Process ID* IE within the RIC INDICATION message, and the E2 Node shall store current call state, start the associated *RIC Time to Wait* timer, and suspend further processing of the associated RAN function.

The receiving Near-RT RIC shall use the *RIC Request ID* IE to route the Indication to the Near-RT RIC functionality that originated the corresponding RIC Subscription procedure.

If present, the receiving Near-RT RIC may use the *RIC Call Process ID* IE in a subsequent RIC Control procedure.

If the E2 Node had stored an associated *RIC Subsequent Action* IE then, after successful transmission of the RIC INDICATION message, the originating E2 Node shall progress accordingly:

- If the *RIC Subsequent Action Type* IE was set to Continue or Halt, the associated *RIC Time to Wait* timer has not yet expired, and a RIC CONTROL REQUEST message is received with the same *RIC Call Process ID* IE, then the E2 Node shall use the RIC CONTROL REQUEST information along with the stored call state and continue to execute any remaining actions in the sequence of RIC Actions defined in the RIC Subscription procedure prior to resuming normal functionality of the associated RAN function.

- If the *RIC Subsequent Action Type* IE was set to Continue and the associated *RIC Time to Wait* timer has expired, then the E2 Node shall use the stored call state and continue to execute any remaining actions in the sequence of RIC Actions defined in the RIC Subscription procedure prior to resuming normal functionality of the associated RAN function.

- If the *RIC Subsequent Action Type* IE was set to Halt and the associated *RIC Time to Wait* timer has expired, then the E2 Node shall abort normal functionality of the associated RAN function. In this case, any remaining actions in the sequence of RIC Actions defined in the RIC Subscription procedure shall also be aborted.

|  |  |  |  |
| --- | --- | --- | --- |
| Subsequent Action | *RIC Time to Wait* timer | Condition | Outcome |
| Continue or Halt | required | E2 Node detected the event trigger in the *RIC Event Trigger Definition* IE. | RIC INDICATION message shall provide the *RIC Call Process ID* IE and E2 Node shall store current call state, start the associated *RIC Time to Wait* timer, and suspend further processing of the associated RAN function. |
| Continue or Halt | not yet expired | E2 Node received the RIC CONTROL REQUEST message with the same *RIC call process ID* IE. | E2 Node shall use the RIC CONTROL information along with the stored call state and continue to execute any remaining actions in the sequence of RIC Actions defined in the RIC Subscription procedure prior to resuming normal functionality of the associated RAN function. |
| Continue | expired |  | E2 Node shall use the stored call state and continue to execute any remaining actions in the sequence of RIC Actions defined in the RIC Subscription procedure prior to resuming normal functionality of the associated RAN function. |
| Halt | expired |  | E2 Node shall abort normal functionality of the associated RAN function. |

Table 8.2.3.2-1: RIC Indication procedure, successful operation

#### 8.2.3.3 Unsuccessful Operation

Not applicable.

#### 8.2.3.4 Abnormal Conditions

Not applicable.

### 8.2.4 RIC Control procedure

#### 8.2.4.1 General

The purpose of the RIC Control procedure is to initiate or resume a specific functionality in the E2 Node.

#### 8.2.4.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran<-near: RIC CONTROL REQUEST

ran-->near: RIC CONTROL ACKNOWLEDGE

@enduml

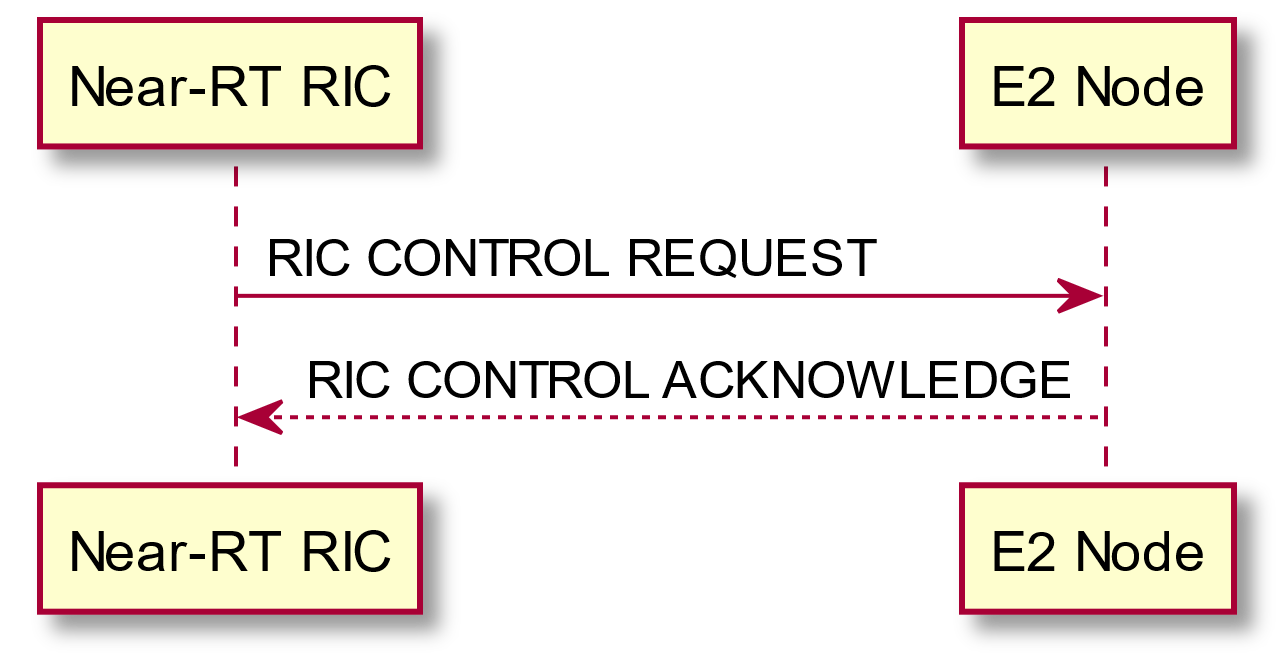


Figure 8.2.4.2-1: RIC Control procedure, successful operation

The Near-RT RIC initiates the procedure by sending the RIC CONTROL REQUEST message containing the *RIC Request ID* IE, assigned by the Near-RT RIC, *RAN Function ID* IE, optionally *RIC Call Process ID* IE, *RIC Control Header* IE, *RIC Control Message* IE and optionally *RIC Control Ack Request* IE to the E2 Node.

When the Near-RT RIC sends the RIC CONTROL REQUEST message and the optional *RIC Control Ack Request* IE has been set to "Ack", or is not present, the Near-RT RIC, it shall start the timer TRICcontrol.

At reception of the RIC CONTROL REQUEST message the target E2 Node shall:

- Determine the target function using the information in the *RAN Function ID* IE and initiate the requested RIC Control procedure action using information in the *RIC Control Message* IE.

- If the *RIC Call Process ID* IE is included in the RIC CONTROL REQUEST message, the E2 Node shall use this IE to identify a specific call process that was previously announced in the RIC INDICATION message and, after confirming that the request has arrived prior to the *RIC Time to Wait* timer had expired, clear the timer.

- If the RIC CONTROL REQUEST message contains the optional *RIC Control Ack Request* IE set to “Ack”, or if the optional *RIC Control Ack Request* IE is not present, and the E2 Node has successfully processed the requested RIC Control procedure action, then the E2 Node shall respond with the RIC CONTROL ACKNOWLEDGE message and continue call processing.

- If the RIC CONTROL REQUEST message contains the optional *RIC Control Ack Request* IE set to “NoAck” and the E2 Node has successfully processed the requested RIC Control procedure action, then the E2 Node shall continue call processing.

Upon reception of the RIC CONTROL ACKNOWLEDGE message, the Near-RT RIC shall stop the timer TRICcontrol and terminate the RIC Control procedure. The Near-RT RIC may use the information contained in the optional *RIC Control Outcome* IE to determine subsequent actions.

#### 8.2.4.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran<-near: RIC CONTROL REQUEST

ran->near: RIC CONTROL FAILURE

@enduml

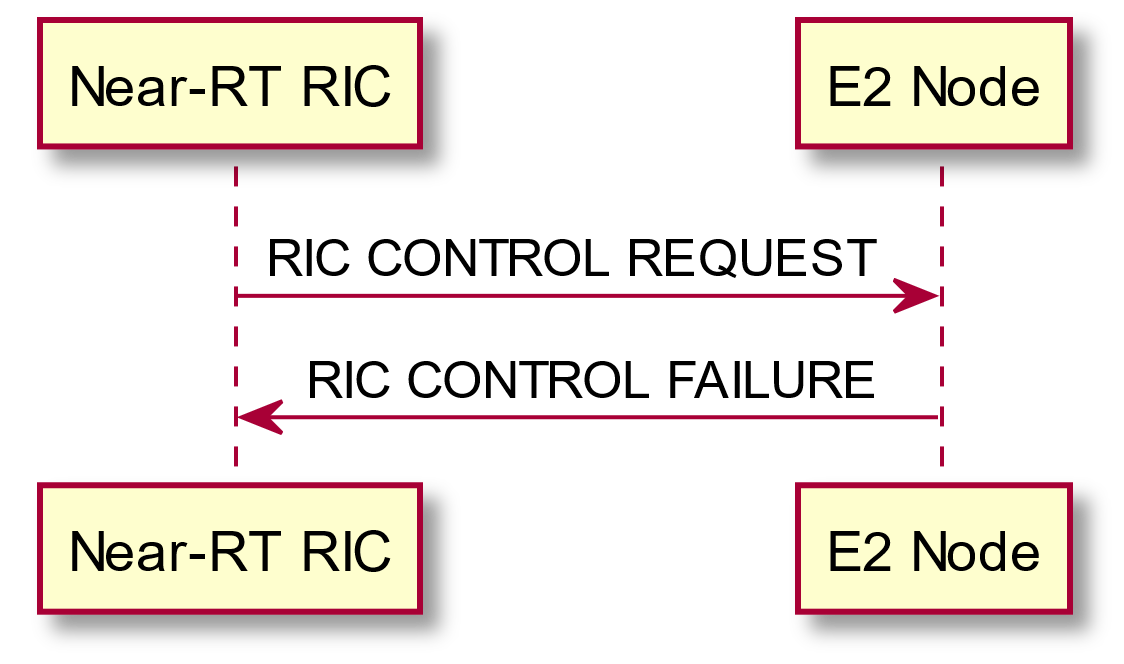


Figure 8.2.4.3-1: RIC Control procedure, unsuccessful operation

If the RIC CONTROL REQUEST message contains an optional *RIC Call Process ID* IE that is invalid then the E2 Node shall respond with the RIC CONTROL FAILURE message with an appropriate cause value.

If the RIC CONTROL REQUEST message contains the optional *RIC Call Process ID* IE for which the associated *RIC Time to Wait* timer had expired, then the E2 Node shall respond with the RIC CONTROL FAILURE message with an appropriate cause value.

If the E2 Node fails to execute the requested RIC Control procedure E2SM specific action, then the E2 Node shall respond with the RIC CONTROL FAILURE message with an appropriate cause value.

If the E2 Node detects an encoding or functional error in the E2SM specific IEs contained in the RIC CONTROL REQUEST message, then the E2 Node shall respond with the RIC CONTROL FAILURE message with an appropriate cause value.

If the E2 Node receives a RIC CONTROL REQUEST message which contains a *RAN Function ID* IE that was not previously announced as a supported RAN function in the E2 Setup procedure or the RIC Service Update procedure, or the E2 Node does not support the specific RIC Control procedure action, then the E2 Node shall respond with the RIC CONTROL FAILURE message with an appropriate cause value..

Upon reception of the RIC CONTROL FAILURE message the Near-RT RIC shall stop the timer TRICcontrol, if running, and terminate the RIC Control procedure. The Near-RT RIC may use the information contained in the *Cause* IE and optional *RIC Control Outcome* IE to determine subsequent actions.

#### 8.2.4.4 Abnormal Conditions

Upon reception of the ERROR INDICATION message including the *RIC Request ID* IE corresponding to the previous RIC CONTROL REQUEST message, the Near-RT RIC shall stop the timer TRICcontrol, if running, and terminate the RIC Control procedure.

If the timer TRICcontrol was set when sending the RIC CONTROL REQUEST message and there was no response from the E2 node before the timer has expired, the Near-RT RIC shall send an ERROR INDICATION with the appropriate value for the *Cause* IE.

### 8.2.5 RIC Subscription Modification procedure

#### 8.2.5.1 General

The purpose of the RIC Subscription Modification procedure is to modify an existing RIC subscription on an E2 node, in terms of its event trigger definition and/or the sequence of actions.

A modification in terms of the event trigger definition of an existing RIC subscription on an E2 node shall refer to any change in the trigger event checkpoint on the E2 node, whereas a modification in terms of the sequence of actions may refer to (i) addition of one or more new actions to the sequence of associated actions, and/or (ii) change in the action definition of one or more existing actions, and/or (iii) any modification to the order of execution of the current sequence of actions, and/or (iv) deletion of one or more existing actions from the sequence of associated actions.

#### 8.2.5.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

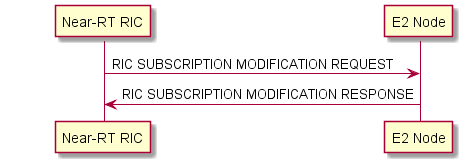
participant “Near-RT RIC” as near

participant “E2 Node” as ran

near -> ran: RIC SUBSCRIPTION MODIFICATION REQUEST

ran->near: RIC SUBSCRIPTION MODIFICATION RESPONSE

@enduml



**Fig 8.2.5.2-1: RIC Subscription Modification procedure, successful operation**

The Near-RT RIC initiates this procedure by sending the RIC SUBSCRIPTION MODIFICATION REQUEST message to the target E2 node, containing the *RIC Request ID* IE to uniquely identify the existing RIC Subscription in the E2 node, the *RAN Function ID* IE to identify the target RAN function in the E2 node supporting the RIC services, the event trigger definition to be modified in the *RIC Event Trigger Definition to be Modified* IE, and/or the sequence of actions (corresponding to the event trigger) to be modified in the (i) *RIC Actions To Be Added List* IE (for new actions to be added to the sequence), (ii) the *RIC Actions To Be Modified List* IE (for existing actions to be modified in the sequence) and/or (iii) the *RIC Actions To Be Removed List* IE (for existing actions to be removed from the sequence). When the Near-RT RIC sends the RIC SUBSCRIPTION MODIFICATION REQUEST message, it shall start the timer TRICEVENTmodify.

Upon reception of the RIC SUBSCRIPTION MODIFICATION REQUEST message, the target E2 node shall determine the existing RIC subscription and the target function from the *RIC Request ID* IE and the *RAN Function ID* IE, respectively.

If the *RIC Event Trigger Definition to be Modified* IE is included, then the target E2 node shall validate and modify the event trigger defined for the existing RIC subscription based on the contents of the IE.

If the *RIC Actions to be Removed List* IE is included, then for every *RIC Action ID* IE included in the list, the target E2 node shall delete the requested action and release the required resources.

If the *RIC Actions to be Modified List* IE is included, then for every *RIC Action ID* IE included in the list for which there exists a corresponding *RIC Action Definition* IE and/or *RIC Subsequent Action* IE, the target E2 node shall replace the existing behavior for the action with the requested modification in the respective IEs*.*

If the *RIC Actions to be Modified List* IE is included, then for every *RIC Action ID* IE included in the list for which there exists a *RIC Action Execution Order* IE, the target E2 node shall replace the current execution order for the action in the sequence of actions with the new execution order for the action in the sequence, as given in the *RIC Action Execution Order* IE.

If the *RIC Actions to be Added List* IE is included, then the target E2 node shall validate and add the requested actions to the existing sequence of actions in order of the *RIC Action Execution Order* IE and allocate the required resources for the new actions.

The target E2 node shall send the RIC SUBSCRIPTION MODIFICATION RESPONSE message back to the Near-RT RIC when one of the following cases is successfully executed:

1. If the *RIC Event Trigger Definition to be Modified* IE is present in the RIC SUBSCRIPTION MODIFICATION REQUEST message and if the requested modification for the event trigger definition was successfully performed by the target E2 node, or
2. If the *RIC Event Trigger Definition to be Modified* IE is not present (i.e., no modification to the event trigger definition was requested) in the RIC SUBSCRIPTION MODIFICATION REQUEST message and if at least one of the requested actions to be added or modified or removed as requested by the Near-RT RIC in *RIC Actions To Be Added List* IE or *RIC Actions to be Modified List* IE or *RIC Actions to be Removed List* IE, respectively in the RIC SUBSCRIPTION MODIFICATION REQUEST message, was successfully performed by the target E2 node.

The target E2 node shall report the result of all the requested modifications to the sequence of actions, if any, back to the Near-RT RIC in the RIC SUBSCRIPTION MODIFICATION RESPONSE message as follows:

* A list of actions requested to be removed, indexed by the *RIC Action ID* IE, which are successfully removed by the E2 node, shall be included in the *RIC Actions Removed List* IE.
* A list of actions requested to be removed, indexed by the *RIC Action ID* IE, which failed to get removed from the sequence by the E2 node, shall be included in the *RIC Actions Failed to be Removed List* IE, with appropriate cause values.
* A list of actions requested to be modified, indexed by the *RIC Action ID* IE, which are successfully modified by the E2 node, shall be included in the *RIC Actions Modified List* IE.
* A list of actions requested to be modified, indexed by the *RIC Action ID* IE, which failed to get modified by the E2 node, shall be included in the *RIC Actions Failed to be Modified List* IE with appropriate cause values.
* A list of actions requested to be added, indexed by the *RIC Action ID* IE, which are successfully added by the E2 node, shall be included in the *RIC Actions Added List* IE
* A list of actions requested to be added, indexed by the *RIC Action ID* IE, which failed to get added to the sequence by the E2 node, shall be included in the *RIC Actions Failed to be Added List* IE with appropriate cause values.

If, for a given *RIC Action ID* IE in the *RIC Actions to be Modified List* IE, more than one modification to the RIC service action is requested in the form of *RIC Action Definition* IE and/or *RIC Action Execution Order* IE and/or *RIC Subsequent Action* IE, then the E2 node shall report that the requested action modification is successfully performed and shall include the action in the *RIC Actions Modified List* IE, if and only if all the requested modifications to the action are successfully performed by the E2 node. Even if one of the requested modifications to the action is not successfully performed by the E2 node, then the E2 node shall include the action in the *RIC Actions Failed to be Modified List* IE, along with an appropriate cause, to indicate failure for the requested modification to the RIC action.

If, for a given *RIC Action ID* IE in the *RIC Actions to be Added* IE, either the action type in the *RIC Action Type* IE or the action definition in the *RIC Action Definition* IE or the action execution order in the *RIC Action Execution Order* IE or the subsequent action, if included, in the *RIC Subsequent Action* IE is not successfully processed by the E2 node, then the E2 node shall include the action in the *RIC Actions Failed to be Added List* IE with an appropriate cause, indicating failure to add the requested action to the existing sequence of actions.

If, after processing the RIC Subscription Modification procedure, more than one RIC service action remains accepted by the E2 Node then, at each occurrence of the common Event Trigger, the sequence of RIC service actions shall be executed according to the considerations defined in section 8.2.1.2.

Upon reception of the RIC SUBSCRIPTION MODIFICATION RESPONSE message, the Near-RT RIC shall stop the timer TRICEVENTmodify and terminate the RIC Subscription Modification procedure.

#### 8.2.5.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

near -> ran: RIC SUBSCRIPTION MODIFICATION REQUEST

ran->near: RIC SUBSCRIPTION MODIFICATION FAILURE

@enduml



**Fig 8.2.5.3-1: RIC Subscription Modification procedure, unsuccessful operation**

The target E2 node shall send a RIC SUBSCRIPTION MODIFICATION FAILURE message to the Near-RT RIC with an appropriate cause value, if one of the following cases is observed:

1. If the *RIC Event Trigger Definition to be Modified* IE is present in the RIC SUBSCRIPTION MODIFICATION REQUEST message and if the requested modification for the event trigger definition failed to get performed by the target E2 node, or
2. If the *RIC Event Trigger Definition to be Modified* IE is present in the RIC SUBSCRIPTION MODIFICATION REQUEST message and if the modification in the event trigger definition is inconsistent or disparate from the event trigger definition in the original subscription, or
3. If the *RIC Event Trigger Definition to be Modified* IE is not present (i.e., no modification to the event trigger definition was requested) and if none of the requested modifications to the sequence of actions was successfully performed (i.e., if the *RIC Actions to be Added List* IE was present in the RIC SUBSCRIPTION MODIFICATION REQUEST message and if none of the requested additions was successfully performed, and/or if the *RIC Actions to be Modified List* IE was present in the RIC SUBSCRIPTION MODIFICATION REQUEST message and if none of the requested modifications was successfully performed, and/or if the *RIC Actions to be Removed List* IE was present in the RIC SUBSCRIPTION MODIFICATION REQUEST message and if none of the requested removals was successfully performed), or
4. If the *RIC Event Trigger Definition to be Modified* IE is not present (i.e., no modification to the event trigger definition was requested) and if the E2 node detects an inconsistency across the sequence of actions and/or the subsequent actions in *RIC Actions to be Added List* IE and/or *RIC Actions to be Modified List* IE and/or *RIC Actions to be Removed List* IE.

Upon reception of the RIC SUBSCRIPTION FAILURE message, the Near-RT RIC shall stop the timer TRICEVENTmodify and terminate the RIC Subscription procedure.

#### 8.2.5.4 Abnormal Conditions

If the target E2 node receives a RIC SUBSCRIPTION MODIFICATION REQUEST message including the *RAN Function ID* IE that was not previously announced as a supported RAN function in the E2 Setup procedure or the RIC Service Update procedure, the target E2 node shall send the RIC SUBSCRIPTION MODIFICATION FAILURE message to the Near-RT RIC with an appropriate cause value.

If the target E2 node receives a RIC SUBSCRIPTION MODIFICATION REQUEST message including the *RIC Request ID* IE that is not known, the target E2 node shall send the RIC SUBSCRIPTION MODIFICATION FAILURE message to the Near-RT RIC with an appropriate cause value.

If the target E2 node receives a RIC SUBSCRIPTION MODIFICATION REQUEST message containing duplicate *RIC Action ID* IE value for multiple actions across those requested to be added/modified/removed, the target E2 node shall send the RIC SUBSCRIPTION MODIFICATION FAILURE message to the Near-RT RIC with an appropriate cause value.

### 8.2.6 RIC Subscription Modification Required procedure

#### 8.2.6.1 General

This procedure enables the E2 Node to request the Near-RT RIC for modifying an existing RIC subscription in the E2 Node.

A required modification of an existing RIC subscription from the E2 Node to the Near-RT RIC may be (i) in terms of one or more existing actions for which the waiting time in the E2 node before executing the subsequent action, given by the *RIC Time To Wait before subsequent action* IE in the *RIC Actions Required to be Modified List* IE, is being requested for modification by the E2 node to the Near-RT RIC, or (ii) in terms of one or more existing actions being requested for deletion by the E2 node to the Near-RT RIC, given by the *RIC Actions Required to be Removed List* IE.

#### 8.2.6.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran -> near: RIC SUBSCRIPTION MODIFICATION REQUIRED

near->ran: RIC SUBSCRIPTION MODIFICATION CONFIRM

@enduml



**Fig 8.2.6.2-1: RIC Subscription Modification Required procedure, successful operation**

The E2 Node initiates the procedure by sending the RIC SUBSCRIPTION MODIFICATION REQUIRED message to the Near-RT RIC. The message shall contain the *RIC Request ID* IE to uniquely identify the existing RIC subscription in the E2 node, the *RAN Function ID* IE to identify the target RAN function in the E2 node, and the sequence of actions to be modified in the *RIC Actions Required to be Modified List* IE (for existing actions that the E2 node requires the Near-RT RIC to modify in the sequence) and/or *RIC Actions Required to be Removed List* IE (for existing actions that the E2 node requires the Near-RT RIC to remove from the sequence).

Upon reception of the RIC SUBSCRIPTION MODIFICATION REQUIRED message, the Near-RT RIC shall determine the RIC subscription from the *RIC Request ID* IE and the target RAN function from the *RAN Function ID* IE.

If at least one of the requested actions in *RIC Actions Required to be Modified List* IE or *RIC Actions Required to be Removed List* IE is successfully confirmed by the Near-RT RIC, then the Near-RT RIC shall perform the required internal procedures to update the RIC subscription records and send the RIC SUBSCRIPTION MODIFICATION CONFIRM message to the E2 node.

The Near-RT RIC shall report the result to the target E2 node in the RIC SUBSCRIPTION MODIFICATION CONFIRM as follows:

- A list of actions requested to be modified, indexed by the *RIC Action ID* IE, which are successfully confirmed for modification by the Near-RT RIC, shall be included in the *RIC Actions Confirmed for Modification List* IE.

- A list of actions requested to be modified, indexed by the *RIC Action ID* IE, which are refused to be modified by the Near-RT RIC, shall be included in the *RIC Actions Refused to be Modified List* IE with appropriate cause values.

- A list of actions requested to be removed, indexed by the *RIC Action ID* IE, which are successfully confirmed for removal by the Near-RT RIC, shall be included in the *RIC Actions Confirmed for Removal List* IE.

- A list of actions requested to be removed, indexed by the *RIC Action ID* IE, which are refused to be removed by the Near-RT RIC, shall be included in the *RIC Actions Refused for Removal List* IE with appropriate cause values.

If, after processing the RIC Subscription Modification Required procedure, more than one RIC service action remains in effect at the E2 node, then at each occurrence of the common Event Trigger, the sequence of RIC service actions shall be executed according to the considerations defined in section 8.2.1.2.

Upon reception of the RIC SUBSCRIPTION MODIFICATION CONFIRM message, the E2 Node shall release the resources for the actions that are confirmed for removal in the *RIC Actions Confirmed for Removal List* IE, if present, and shall (re-)allocate the desired resources for the actions that are confirmed for modification in the *RIC Actions Confirmed for Modification List* IE, if present.

#### 8.2.6.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

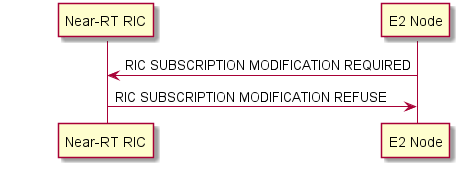
participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran -> near: RIC SUBSCRIPTION MODIFICATION REQUIRED

near->ran: RIC SUBSCRIPTION MODIFICATION REFUSE

@enduml



**Fig 8.2.6.3-1: RIC Subscription Modification Required procedure, unsuccessful operation**

The Near-RT RIC shall send the RIC SUBSCRIPTION MODIFICATION REFUSE message to the E2 node with an appropriate cause, if one of the following cases is observed:

1. If none of the requested modifications to the actions in the RIC SUBSCRIPTION MODIFICATION REQUIRED message (i.e., in the *RIC Actions Required to be Modified List* IE and the *RIC Actions Required to be Removed List* IE, if present) is successfully confirmed by the Near-RT RIC, and/or
2. If the Near-RT RIC detects an inconsistency across the requested sequence of actions to be modified and removed in *RIC Actions Required to be Modified List* IE and the *RIC Actions Required to be Removed List* IE respectively, if present.

#### 8.2.6.4 Abnormal Conditions

If the Near-RT RIC receives a RIC SUBSCRIPTION MODIFICATION REQUIRED message which contains a *RAN Function ID* IE that was not previously announced as a supported RAN function in the E2 Setup procedure or the RIC Service Update procedure, the Near-RT RIC shall send the RIC SUBSCRIPTION MODIFICATION REFUSE message to the E2 Node with an appropriate cause value.

If the Near-RT RIC receives a RIC SUBSCRIPTION MODIFICATION REQUIRED message containing a *RIC Request ID* IE that does not correspond to an existing RIC subscription, the Near-RT RIC shall send the RIC SUBSCRIPTION MODIFICATION REFUSE message to the E2 Node with an appropriate cause value.

### 8.2.7 RIC Query procedure

#### 8.2.7.1 General

This procedure is initiated by Near-RT RIC to request RAN and/or UE related information from E2 Node.

#### 8.2.7.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

near -> ran: RIC QUERY REQUEST

ran->near: RIC QUERY RESPONSE

@enduml

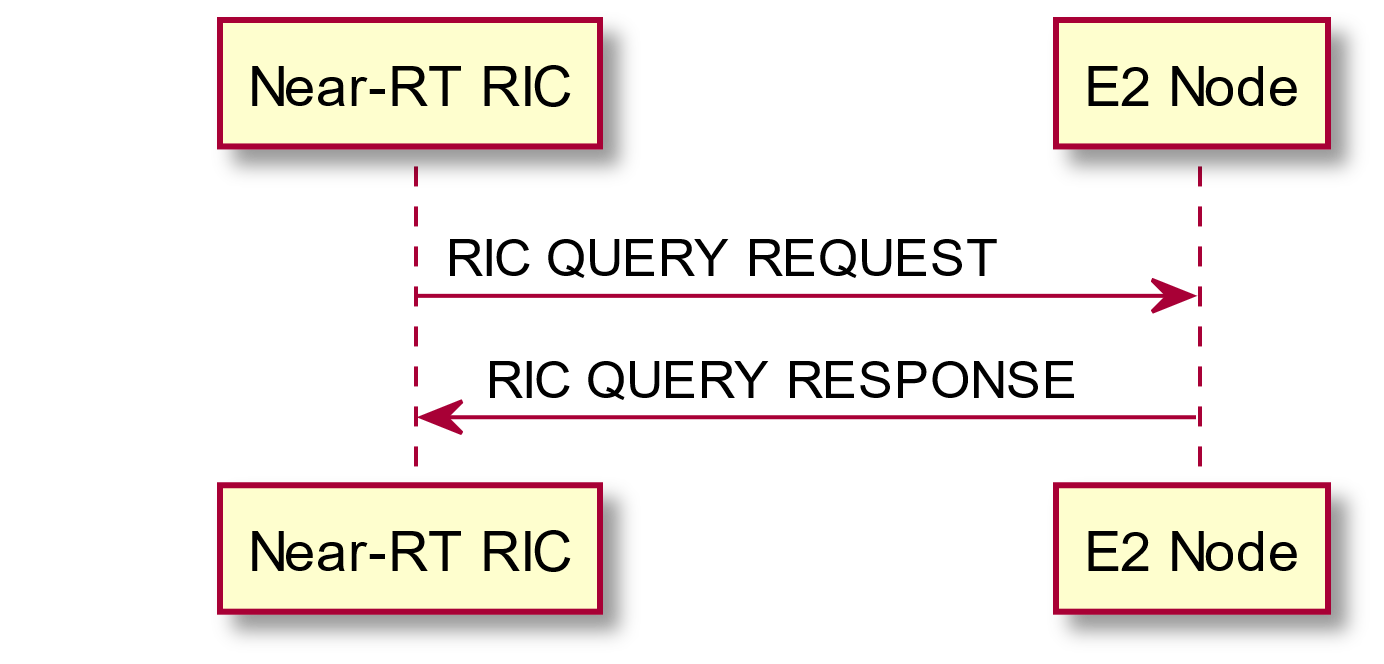


Figure 8.2.7.2-1: Near-RT RIC Query procedure, successful operation

The Near-RT RIC initiates the procedure by sending the RIC QUERY REQUEST message containing a unique *RIC Request ID* IE, assigned by the Near-RT RIC, *RIC Query Header* IE and *RIC Query Definition* IE to the target E2 Node. When the Near-RT RIC sends the RIC QUERY REQUEST message, it shall start the timer TRICquery.

At reception of the RIC QUERY REQUEST message the target E2 Node shall:

* Determine the target function using the information in the *RAN Function ID* IE.
* Validate the *RIC Query Header* IE and *RIC Query Definition* IE and if the requested information is available at E2 Node, then E2 Node shall respond back with RIC QUERY RESPONSE message containing the requested information.

Upon reception of the RIC QUERY RESPONSE message the Near-RT RIC shall stop the timer TRICquery and terminate the RIC Query procedure.

#### 8.2.7.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

near -> ran: RIC QUERY REQUEST

ran->near: RIC QUERY FAILURE

@enduml

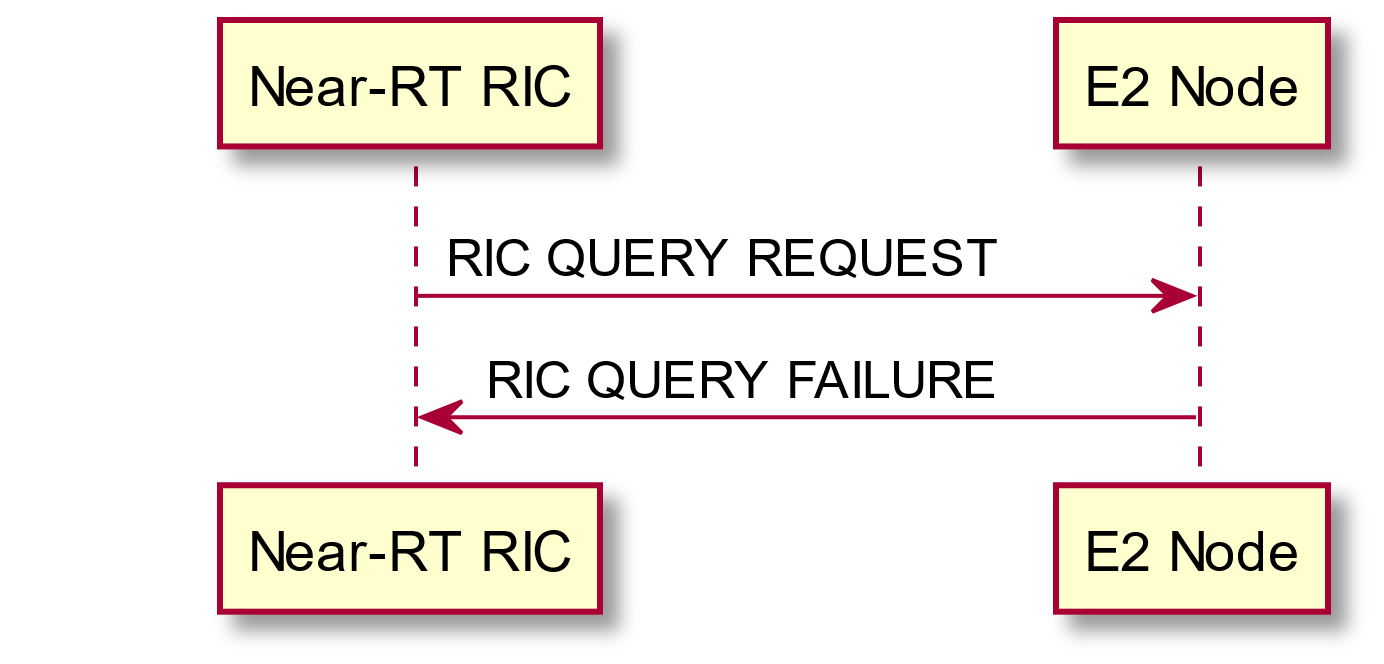


Figure 8.2.7.3-1: Near-RT RIC Query procedure, unsuccessful operation

If the *RAN Function ID* IE in the RIC QUERY REQUEST message is not supported by E2 Node, then the E2 Node shall respond with the RIC QUERY FAILURE message to Near-RT RIC with an appropriate cause value.

If all of the requested information in the *RIC Query Definition* IE are invalid, then the E2 Node shall respond with the RIC QUERY FAILURE message to Near-RT RIC with an appropriate cause value.

If none of the requested information in the *RIC Query Definition* IE are available at E2 Node, then E2 Node shall respond with the RIC QUERY FAILURE message to Near-RT RIC with an appropriate cause value.

Upon reception of the RIC QUERY FAILURE message the Near-RT RIC shall stop the timer TRICquery and terminate the RIC Query Procedure.

#### 8.2.7.4 Abnormal Conditions

Upon reception of the ERROR INDICATION message including the *RIC Request ID* IE corresponding to the previous RIC QUERY REQUEST message, the Near-RT RIC shall stop the timer TRICquery, if running, and terminate the RIC Query procedure.

## 8.3 Global Procedures

### 8.3.1 E2 Setup procedure

#### 8.3.1.1 General

The purpose of the E2 Setup procedure is to establish the signaling connection between E2 Node and Near-RT RIC. This procedure erases any existing application level configuration data in the two nodes and replaces it by the one received. This procedure also resets the E2 interface like a Reset procedure would do.

Note that this procedure performs the basic interface setup and transfers E2 Node specific configuration information to the Near-RT RIC.

This procedure shall be initiated by the E2 Node.

#### 8.3.1.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: E2 SETUP REQUEST

ran<-near: E2 SETUP RESPONSE

@enduml

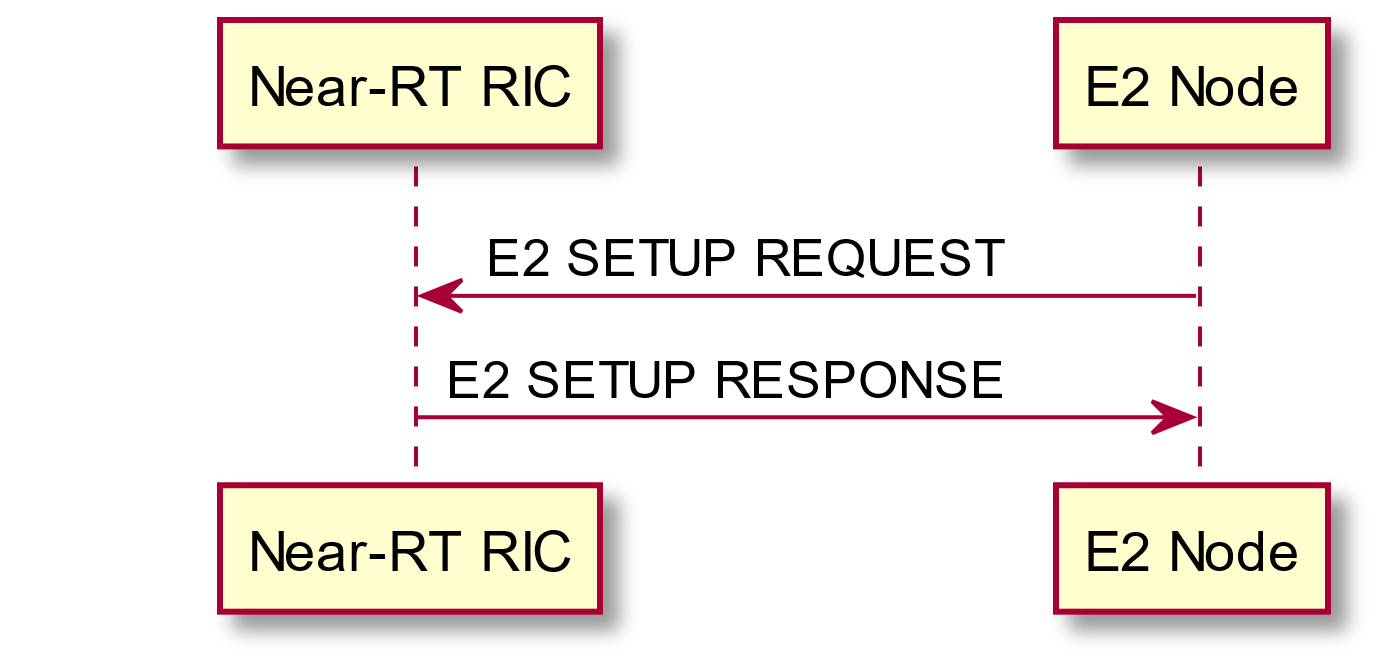


Figure 8.3.1.2-1: E2 Setup procedure, successful operation

An E2 Node initiates the procedure by sending the E2 SETUP REQUEST message including the appropriate data to a Near-RT RIC. The Near-RT RIC replies with the E2 SETUP RESPONSE message including the appropriate data.

If the Near-RT RIC has successfully processed the *RAN Functions Added List* IE, also present in the RIC SERVICE UPDATE message, then Near-RT RIC shall contain, in the E2 SETUP RESPONSE message, the *RAN Functions* *Accepted List* IE and/or the *RAN Functions Rejected List* IE, also present in the RIC SERVICE UPDATE ACKNOWLEDGE message.

If the Near-RT RIC has successfully processed the *E2 Node Component Configuration Addition List* IE, also present in the E2 NODE CONFIGURATION UPDATE message, then Near-RT RIC shall contain, in the E2 SETUP RESPONSE message, the *E2 Node Component Configuration Addition Acknowledge List* IE, also present in the E2 NODE CONFIGURATION UPDATE ACKNOWLEDGE message.

Note that the RIC Service Update procedure is defined in section 8.3.4 and the E2 Node Configuration Update procedure is defined in section 8.3.5.

#### 8.3.1.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: E2 SETUP REQUEST

ran<-near: E2 SETUP FAILURE

@enduml

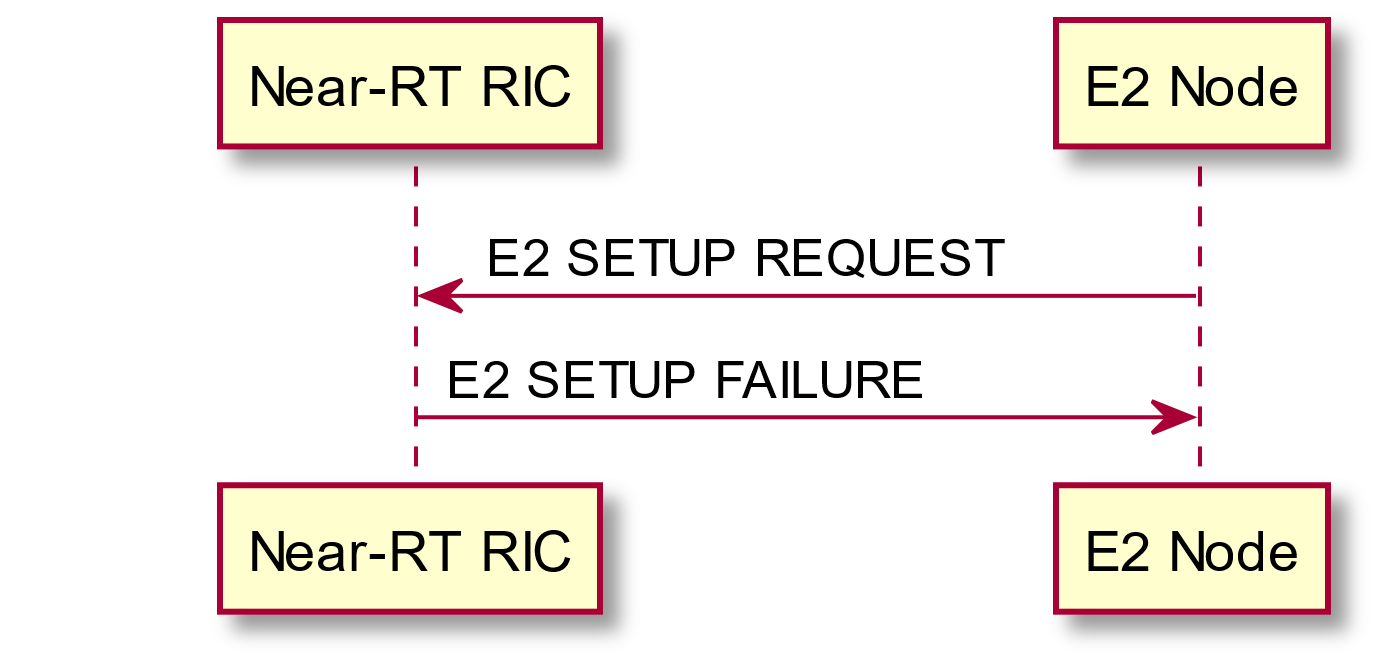


Figure 8.3.1.3-1: E2 Setup procedure, unsuccessful operation

If the Near-RT RIC cannot accept the setup it shall respond with an E2 SETUP FAILURE message with an appropriate cause value. The Near-RT RIC may provide an alternative *Transport Layer Information* IE for the E2 Node to use when reinitiating the E2 Setup procedure towards the Near-RT RIC.

If the E2 SETUP FAILURE message includes the *Time To Wait* IE, the E2 node shall wait at least for the indicated time before reinitiating the E2 Setup procedure towards the Near-RT RIC.

#### 8.3.1.4 Abnormal Conditions

If the first message received for a specific TNL association is not an E2 SETUP REQUEST, E2 SETUP RESPONSE, E2 SETUP FAILURE or E2 NODE CONFIGURATION UPDATE message then this shall be treated as a logical error.

If the E2 node does not receive either the E2 SETUP RESPONSE message or the E2 SETUP FAILURE message, the E2 node may reinitiate the E2 Setup procedure towards the same Near-RT RIC using the same TNL association, provided that the content of the new E2 SETUP REQUEST message is identical to the content of the previously unacknowledged E2 SETUP REQUEST message.

### 8.3.2 Reset procedure

#### 8.3.2.1 General

The purpose of the Reset procedure is to align the resources in E2 Node and Near-RT RIC in the event of an abnormal failure. The procedure resets the E2 interface. This procedure doesn’t affect the application level configuration data exchanged during the E2 Setup procedure, E2 Node Configuration Update procedure and RIC Service Update procedure.

#### 8.3.2.2 Successful Operation

This procedure may be initiated by either Near-RT RIC or E2 Node.

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: RESET REQUEST

ran<-near: RESET RESPONSE

@enduml

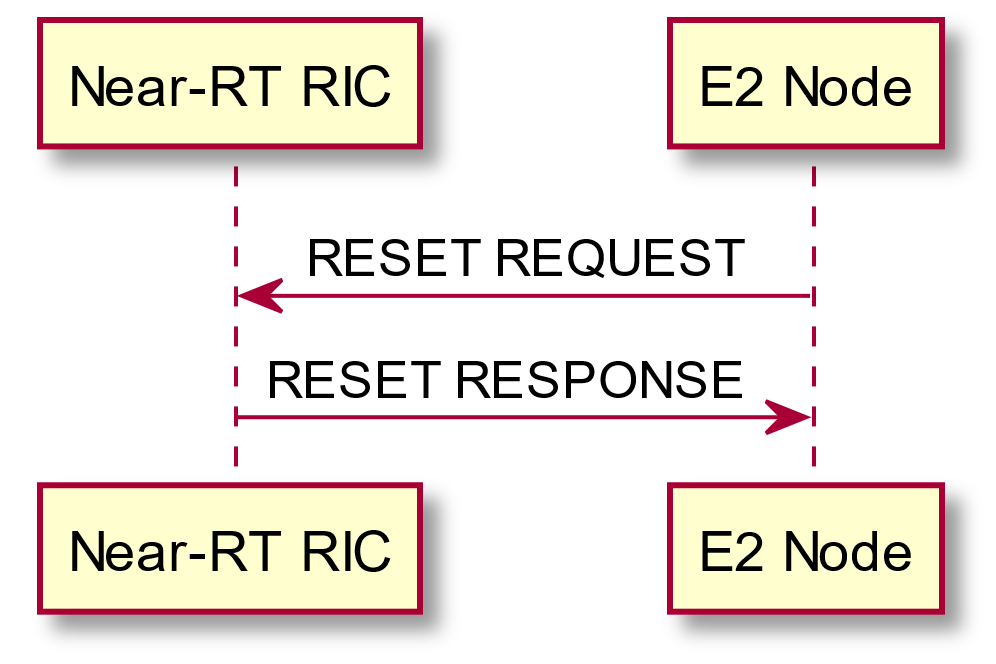


Figure 8.3.2.2-1: Reset, successful operation (E2 Node Initiated)

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran<-near: RESET REQUEST

ran->near: RESET RESPONSE

@enduml

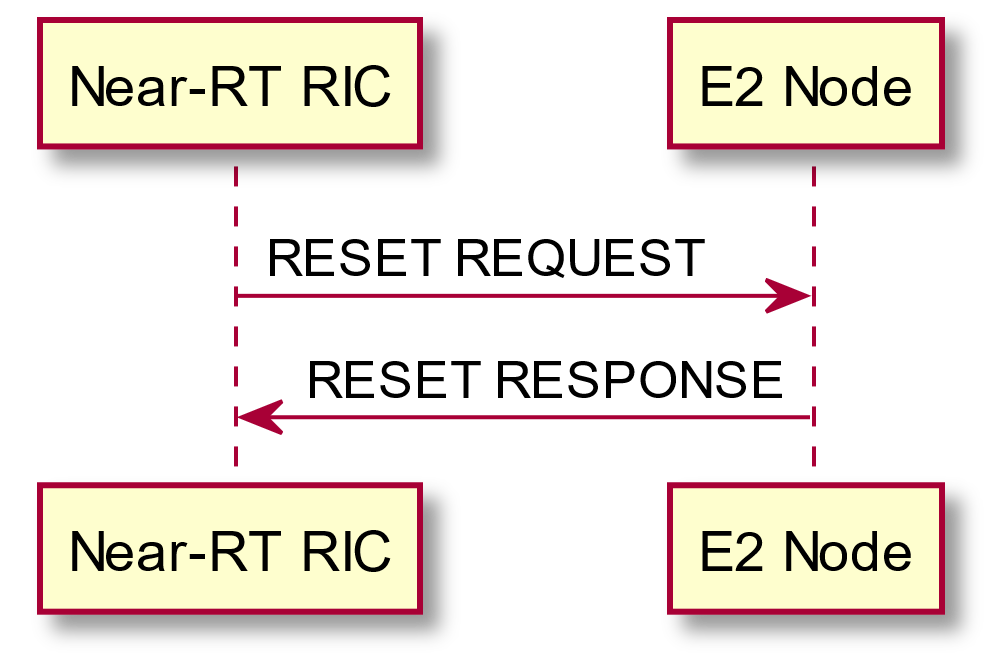


Figure 8.3.2.2-2: Reset, successful operation (Near-RT RIC Initiated)

When the Reset procedure is initiated, the Near-RT RIC and E2 Node shall:

- Delete any pre-established RIC Subscriptions,

- Gracefully terminate any ongoing Near-RT RIC call processes using **INSERT**, **CONTROL** or **POLICY** services while ensuring that impact to ongoing calls for connected UE is minimized.

After the Reset has been completed, the Near-RT RIC shall re-issue any required Subscriptions.

**Interactions with other procedures:**

If the RESET REQUEST message is received, any other ongoing procedure (except for another Reset procedure) on the same E2 interface related to ongoing RIC Services shall be aborted.

#### 8.3.2.3 Unsuccessful Operation

Void.

#### 8.3.2.4 Abnormal Conditions

If the initiating node does not receive the RESET RESPONSE message, the initiating node may reinitiate the Reset procedure towards the same target node, provided that the content of the new RESET REQUEST message is identical to the content of the previously unacknowledged RESET REQUEST message.

### 8.3.3 Error Indication

#### 8.3.3.1 General

The Error Indication procedure is initiated by either the E2 Node or the Near-RT RIC to report detected errors in one incoming message, provided they cannot be reported by an appropriate failure message.

#### 8.3.3.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: ERROR INDICATION

@enduml

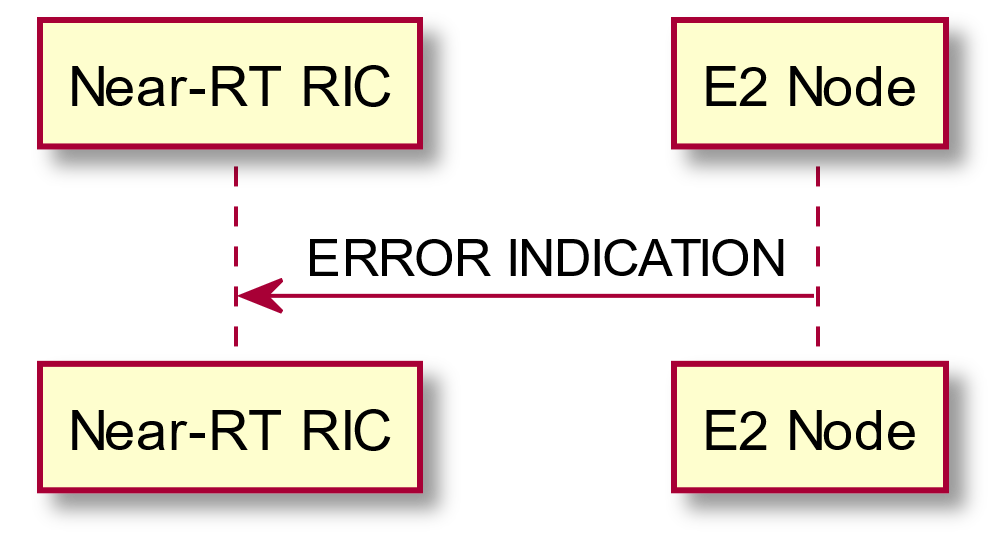


Figure 8.3.3.2-1: Error Indication, (E2 Node initiated) successful operation.

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran<-near: ERROR INDICATION

@enduml

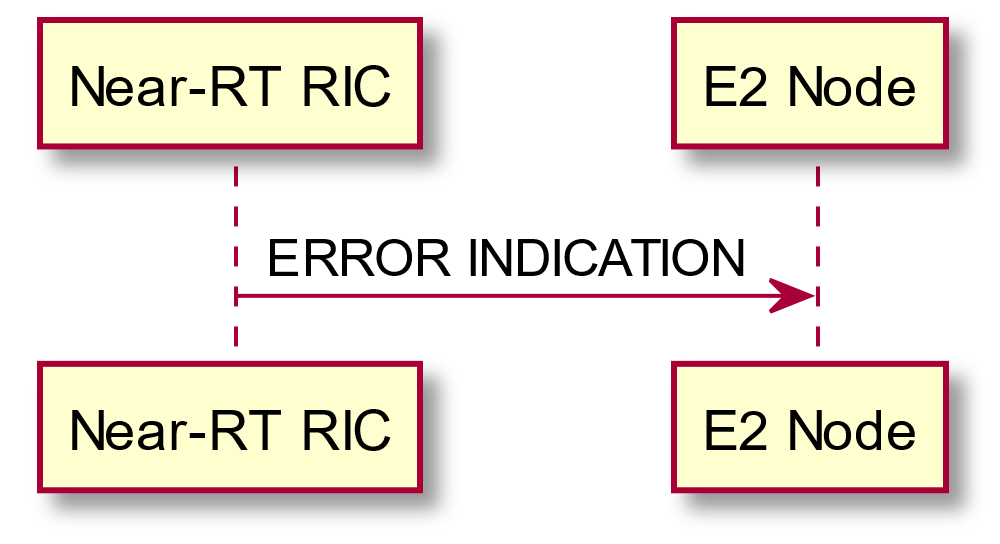


Figure 8.3.3.2-2: Error Indication, (Near-RT RIC Initiated) successful operation.

When the conditions defined in clause 10 are fulfilled, the Error Indication procedure is initiated by an ERROR INDICATION message sent from the node detecting the error situation.

The ERROR INDICATION message shall contain at least either the *Cause* IE or the *Criticality Diagnostics* IE and may include *RAN Function ID* IE and *RIC Request ID* IE.

#### 8.3.3.3 Unsuccessful Operation

Not applicable.

#### 8.3.3.4 Abnormal Conditions

Not applicable.

### 8.3.4 RIC Service Update procedure

#### 8.3.4.1 General

The purpose of the RIC Service Update procedure is to update application level configuration data needed for E2 Node and Near-RT RIC to interoperate correctly over the E2 interface.

#### 8.3.4.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran<--near: RIC SERVICE QUERY

ran->near: RIC SERVICE UPDATE

ran<-near: RIC SERVICE UPDATE ACKNOWLEDGE

@enduml

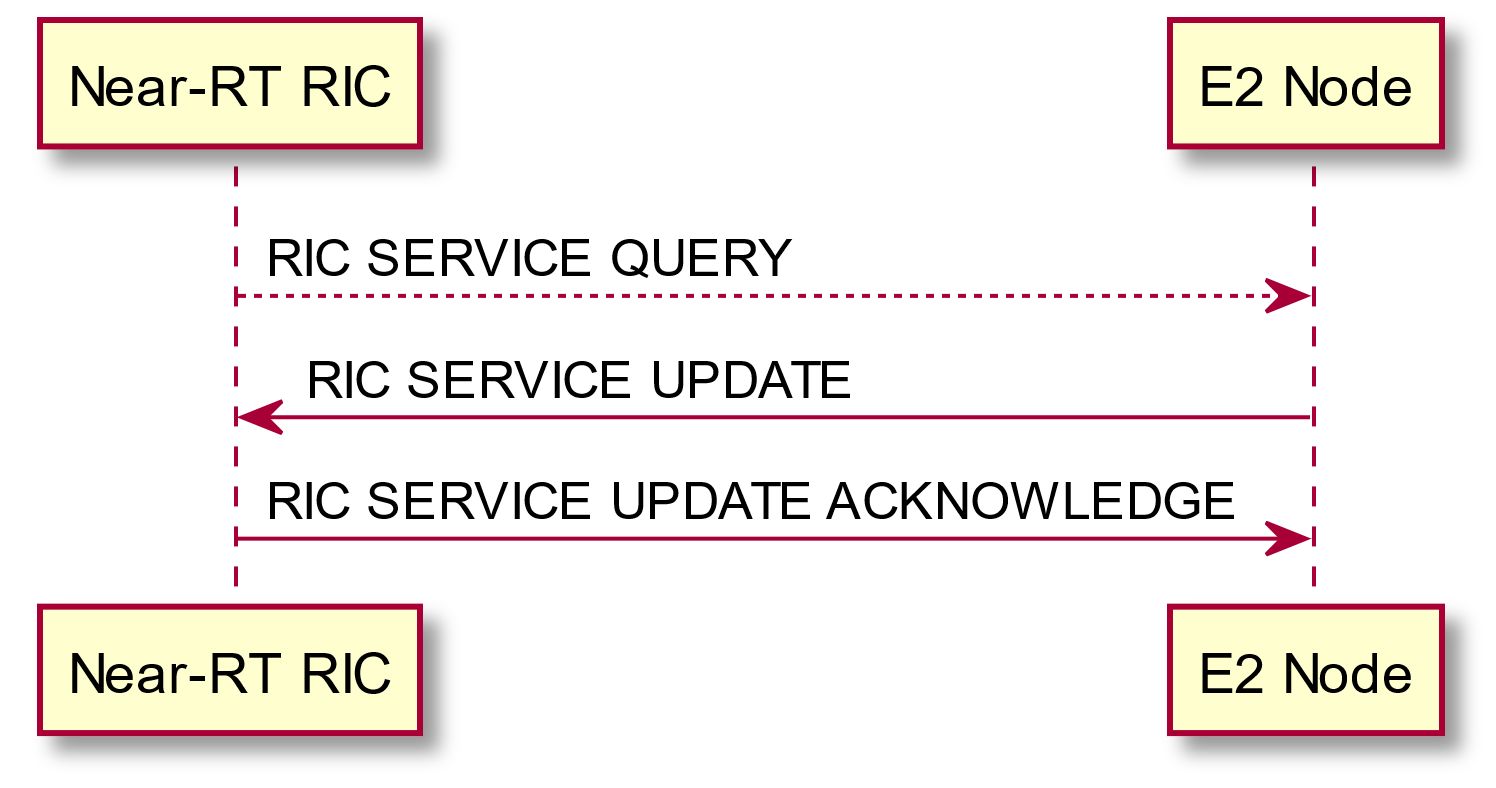


Figure 8.3.4.2-1: RIC Service Update procedure, successful operation

An E2 Node initiates the procedure by sending a RIC SERVICE UPDATE message to the Near-RT RIC. Such message shall include an appropriate set of up-to-date Near-RT RIC service-related configuration data, including, but not limited to, the complete lists of added, modified and deleted supported Near-RT RIC Service functions that E2 Node has just taken into operational use along with a revision counter for each item in each list.

Upon reception of a RIC SERVICE UPDATE message, Near-RT RIC shall update the information for E2 Node as follows:

Update of Supported Near-RT RIC service Information:

- If the *RAN Function Added List* IE is contained in the RIC SERVICE UPDATE message, Near-RT RIC shall add each listed accepted function information according to the information in the *RAN Function ID* IE and *RAN Function Definition* IE and store the corresponding *RAN Function Revision* IE.

- If the *RAN Function Modified List* IE is contained in the RIC SERVICE UPDATE message, Near-RT RIC shall modify accepted information of supported functions according to the information in the *RAN Function Definition* IE and update the corresponding *RAN Function Revision* IE.

- If the *RAN Function Deleted List* IE is contained in the RIC SERVICE UPDATE message, Near-RT RIC shall delete information of RAN Function indicated by the *RAN Function ID* IE along with the corresponding *RAN Function Revision* IE.

These changes may be processed in the Near-RT-RIC and may be used when issuing RIC SUBSCRIPTION REQUEST and RIC CONTROL to provide valid *RAN Function ID* IE.

If at least one RAN Function update request present in the RIC SERVICE UPDATE message is successful, then the Near-RT RIC shall send the RIC SERVICE UPDATE ACKNOWLEDGE message to the initiating E2 Node with the *RAN Functions Accepted List* IE indicating accepted requests to add, modify, and/or delete the corresponding RAN Function information and, if required, the *RAN Functions Rejected List* IE indicating rejected requests to add, modify, and/or delete the corresponding RAN Function information.

If the Near-RT RIC receives a RIC SERVICE UPDATE message without any IE except for *Message Typ*eIE, then the Near-RT RIC shall reply with RIC SERVICE UPDATE ACKNOWLEDGE message without any IE except for *Message Typ*eIE without performing any updates to the existing configuration.

Optionally, the RIC SERVICE UPDATE message to the Near-RT RIC may have been sent as a response to the Near-RT RIC initiated RIC SERVICE QUERY message. Upon reception of the RIC SERVICE QUERY message:

- If the *RAN Function Accepted List* IE is not present, the E2 Node shall send the RIC SERVICE UPDATE message with the complete list of supported RAN Functions in the *RAN Function Added List* IE

- If the *RAN Function Accepted List* IE is present and aligns with the list of supported RAN Functions at the E2 Node, the E2 Node shall send the RIC SERVICE UPDATE message without the *RAN Function Added List* IE, *RAN Function Modified List* IE and *RAN Function Deleted List* IE.

- If the *RAN Function Accepted List* IE is present and the list of RAN Functions in the *RAN Function Accepted List* IE does not align with the list of supported RAN Functions at the E2 node, the E2 Node shall send the RIC SERVICE UPDATE message with the *RAN Function Added List* IE, *RAN Function Modified List* IE and/or *RAN Function Deleted List* IE to ensure realignment of RAN Functions between the E2 Node and the Near-RT RIC.

#### 8.3.4.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran<--near: RIC SERVICE QUERY

ran->near: RIC SERVICE UPDATE

ran<-near: RIC SERVICE UPDATE FAILURE

@enduml

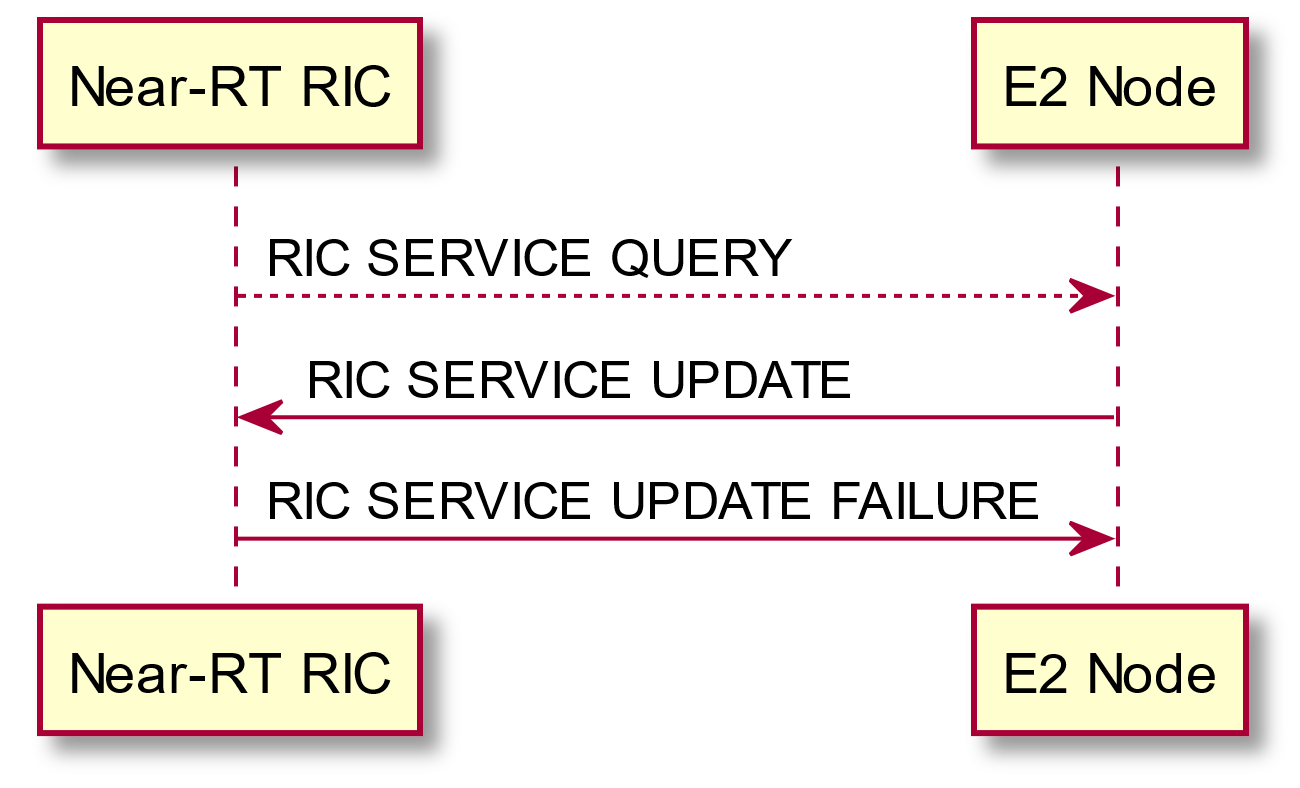


Figure 8.3.4.3-1: RIC Service Update procedure, unsuccessful operation

If the Near-RT RIC cannot accept the update it shall respond with a RIC SERVICE UPDATE FAILURE message and appropriate cause value.

If the RIC SERVICE UPDATE FAILURE message includes the *Time To Wait* IE, the E2 Node shall wait at least for the indicated time before reinitiating the RIC Service Update procedure towards the same Near-RT RIC. Both nodes shall continue to operate the E2 with their existing Near-RT RIC Service data.

#### 8.3.4.4 Abnormal Conditions

If the E2 Node after initiating a RIC Service Update procedure receives neither the RIC SERVICE UPDATE ACKNOWLEDGE message nor the RIC SERVICE UPDATE FAILURE message, the E2 Node may reinitiate the RIC Service Update procedure towards the same Near-RT RIC, provided that the content of the new RIC SERVICE UPDATE message is identical to the content of the previously unacknowledged RIC SERVICE UPDATE message.

### 8.3.5 E2 Node Configuration Update procedure

#### 8.3.5.1 General

The purpose of the E2 Node Configuration Update procedure is to update application level E2 Node configuration data needed for E2 Node and Near-RT RIC to interoperate correctly over the E2 interface and to support E2 Node initiated TNL association removal.

#### 8.3.5.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: E2 NODE CONFIGURATION UPDATE

ran<-near: E2 NODE CONFIGURATION UPDATE ACKNOWLEDGE

@enduml

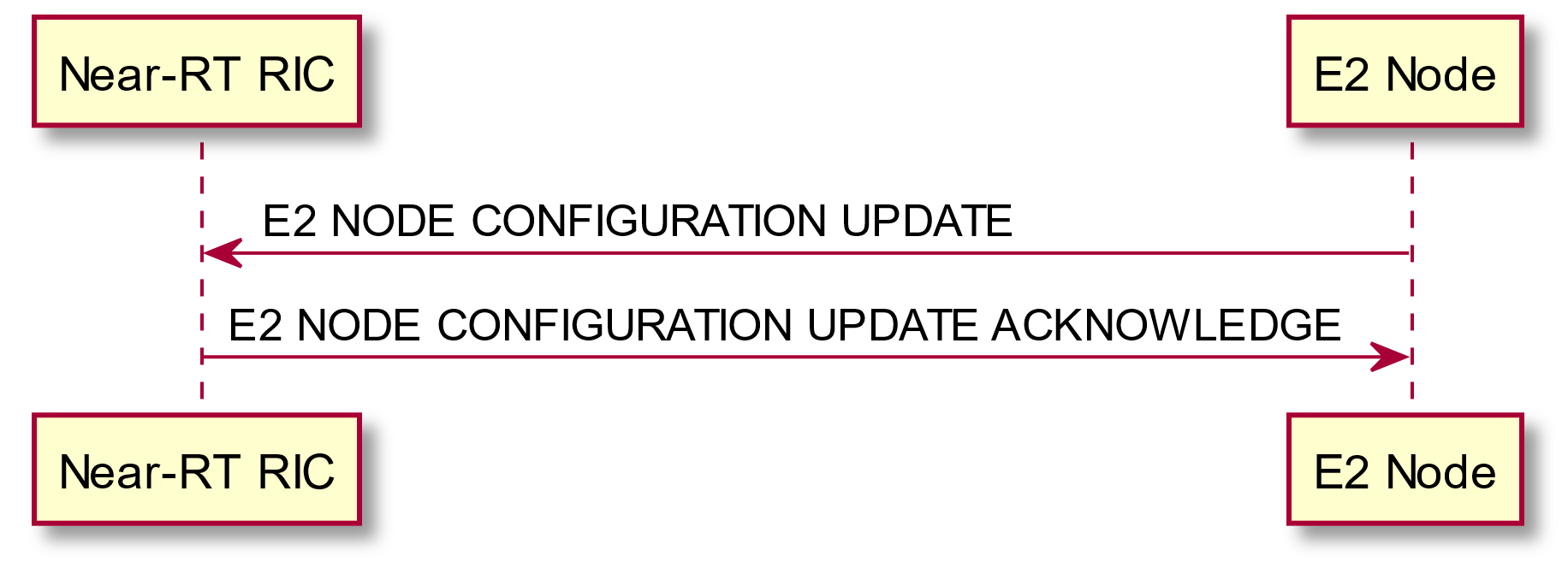


Figure 8.3.5.2-1: E2 Node Configuration Update procedure, successful operation

An E2 Node initiates the procedure by sending a E2 NODE CONFIGURATION UPDATE message to the Near-RT RIC. Such message shall include an appropriate set of up-to-date E2 Node-related configuration data that the E2 Node has just taken into operational use.

Upon reception of the E2 NODE CONFIGURATION UPDATE message, Near-RT RIC shall update the information for the E2 Node as follows:

Update of E2 Node configuration information in Near-RT RIC:

- If *E2 Node Component Configuration Addition List* IE is contained in the E2 NODE CONFIGURATION UPDATE message, Near-RT RIC shall add the E2 Node Component Configuration information accordingly.

- If *E2 Node Component Configuration Update List* IE is contained in the E2 NODE CONFIGURATION UPDATE message, Near-RT RIC shall modify the E2 Node Component Configuration information accordingly.

- If *E2 Node Component Configuration Removal List* IE is contained in the E2 NODE CONFIGURATION UPDATE message, Near-RT RIC shall remove the E2 Node Component Configuration information accordingly

If *Global E2 Node ID* IE is contained in the E2 NODE CONFIGURATION UPDATE message for a newly established SCTP association, the Near-RT RIC will associate this association with the related E2 Node.

If the E2 NODE CONFIGURATION UPDATE message includes *E2 Node TNL Association To Remove List* IE, and the *Endpoint IP address* IE and the *Port Number* IE for both TNL endpoints of the TNL association(s) are included in the *E2 Node TNL Association To Remove List* IE, the Near-RT RIC shall, if supported, consider that the TNL association(s) indicated by both received TNL endpoints will be removed by the E2 Node. If the *Endpoint IP address* IE, or the *Endpoint IP address* IE and the *Port Number* IE for one or both of the TNL endpoints is included in the *E2 Node TNL Association To Remove List* IE in E2 NODE CONFIGURATION UPDATE message, the Near-RT RIC shall, if supported, consider that the TNL association(s) indicated by the received endpoint IP address(es) will be removed by the E2 Node.

After successful update of requested information, Near-RT RIC shall reply with the E2 NODE CONFIGURATION UPDATE ACKNOWLEDGE message to inform the initiating E2 Node that the requested update of application data was performed successfully. In case the Near-RT RIC receives a E2 NODE CONFIGURATION UPDATE message without any IE except for *Message Typ*eIE and *Transaction ID* IE it shall reply with the E2 NODE CONFIGURATION UPDATE ACKNOWLEDGE message without performing any updates to the existing configuration. In the case where the Near-RT RIC receives an *E2 Node Component Configuration Update Item* IE for an E2 Node component that was not previously declared by an *E2 Node Component Configuration Addition Item* IE then the Near-RT RIC shall indicate to the E2 Node that the update failed with appropriate cause value.

#### 8.3.5.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: E2 NODE CONFIGURATION UPDATE

ran<-near: E2 NODE CONFIGURATION UPDATE FAILURE

@enduml

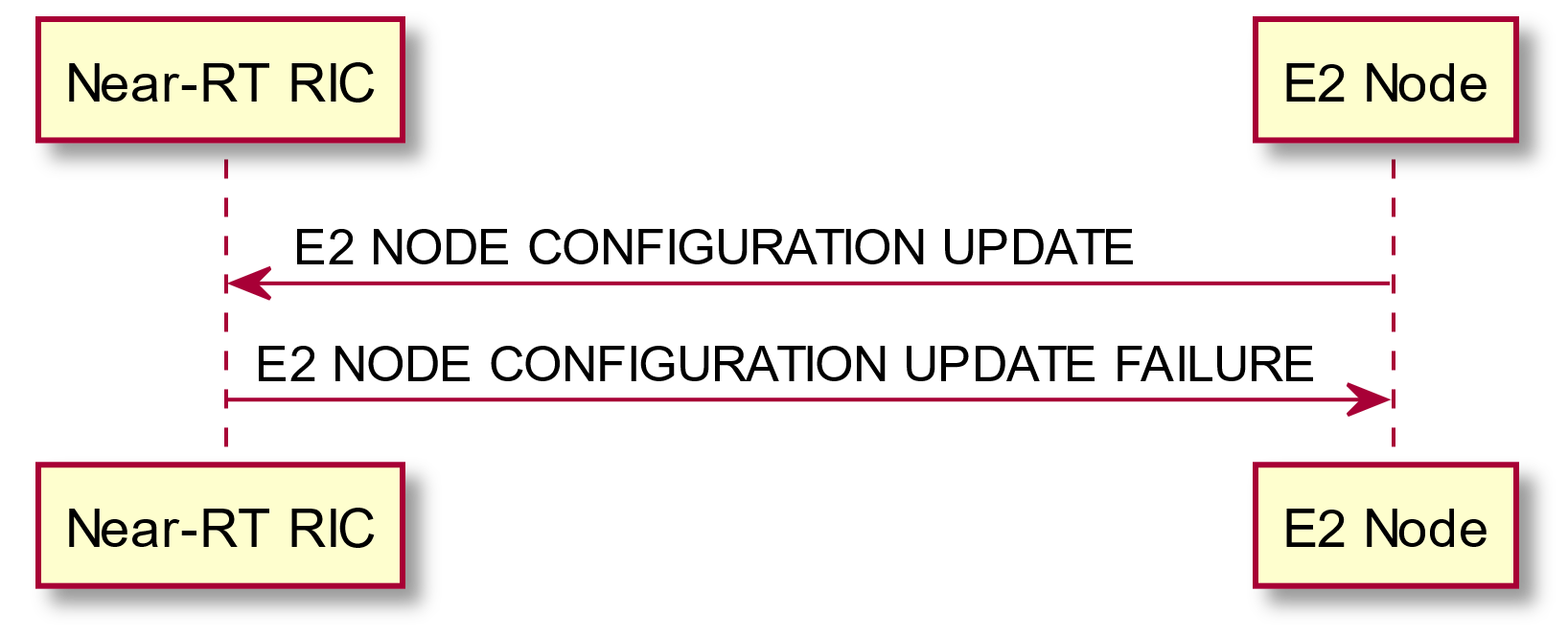


Figure 8.3.5.3-1: E2 Node Configuration Update procedure, unsuccessful operation

If Near-RT RIC cannot accept the E2 NODE CONFIGURATION UPDATE message it shall respond with the E2 NODE CONFIGURATION UPDATE FAILURE message and appropriate cause value.

If the E2 NODE CONFIGURATION UPDATE FAILURE message includes the *Time To Wait* IE the E2 Node shall wait at least for the indicated time before reinitiating the E2 Node Configuration Update procedure towards the same Near-RT RIC. Both nodes shall continue to operate with their existing configuration data.

#### 8.3.5.4 Abnormal Conditions

If an E2 Node, after initiating the E2 Node Configuration Update procedure, receives neither the E2 NODE CONFIGURATION UPDATE ACKNOWLEDGE message nor the E2 NODE CONFIGURATION UPDATE FAILURE message, the E2 Node may reinitiate the E2 Node Configuration Update procedure towards the same Near-RT RIC, provided that the content of the new E2 NODE CONFIGURATION UPDATE message is identical to the content of the previously unacknowledged E2 NODE CONFIGURATION UPDATE message.

### 8.3.6 E2 Connection Update procedure

#### 8.3.6.1 General

The purpose of the E2 Connection Update procedure is to allow the Near-RT RIC to update the E2 interface connection between the E2 Node and Near-RT RIC.

#### 8.3.6.2 Successful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

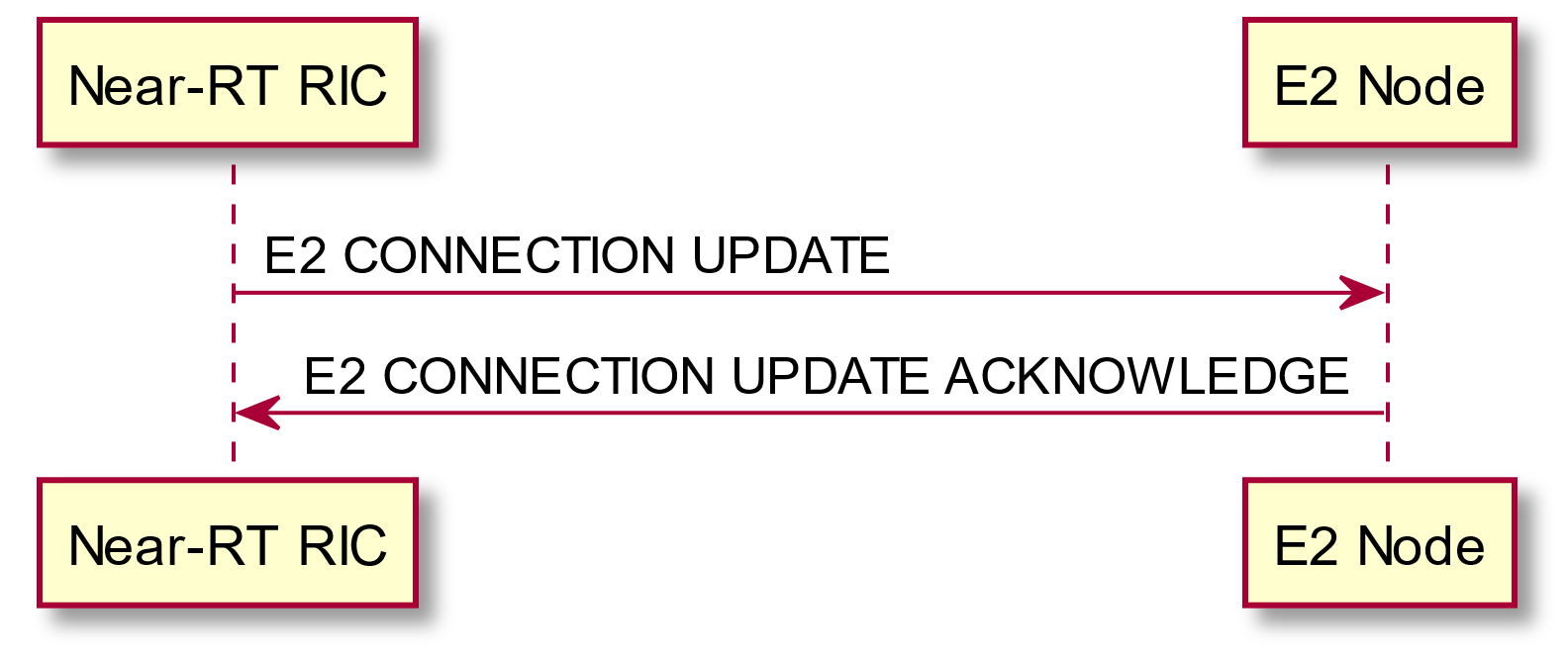
participant “Near-RT RIC” as near

participant “E2 Node” as ran

near->ran: E2 CONNECTION UPDATE

near<-ran: E2 CONNECTION UPDATE ACKNOWLEDGE

@enduml



**Figure 8.3.6.2-1: E2 Connection Update procedure, successful operation**

The Near-RT RIC initiates the procedure by sending a E2 CONNECTION UPDATE message to the E2 Node. Such message shall include an appropriate set of up-to-date E2 interface connection data that the E2 Node shall take into account when modifying the E2 interface connection.

Upon reception of a E2 CONNECTION UPDATE message, the E2 Node shall update as follows:

If *E2 Connection To Add List* IE is contained in the E2 CONNECTION UPDATE message, then the E2 Node shall, if supported, use it to establish additional TNL Association(s) and configure for use for RIC services and/or E2 support functions according to the *TNL Association Usage* IE in the message.

If *E2 Connection To Modify List* IE is contained in the E2 CONNECTION UPDATE message, then the E2 Node shall, if supported, use it to modify the existing usage for RIC services and/or E2 support functions, according to the *TNL Association Usage* IE in the message.

If *E2 Connection To Remove List* IE is contained in the E2 CONNECTION UPDATE message, then the E2 Node shall, if supported, use it to remove the existing connection(s). If only one connection remains after successful removal of other connections, the E2 Node shall use this remaining connection for all the RIC services and E2 support functions.

After successful update of E2 interface connection(s), the E2 Node shall reply with the E2 CONNECTION UPDATE ACKNOWLEDGE message to inform the initiating Near-RT RIC that the requested E2 connection update was performed successfully. In case the E2 Node receives a E2 CONNECTION UPDATE message without any IE except for *Message Typ*eIE and *Transaction ID* IE, it shall reply with the E2 CONNECTION ACKNOWLEDGE message without performing any updates to the existing connections.

E2 NODE CONFIGURATION UPDATE procedure shall be the first E2AP procedure triggered on an additional TNLA of an already setup E2 interface instance after the TNL association has become operational, and the Near-RT RIC shall associate the TNLA to the E2 interface instance using the included *Global E2 Node ID*. An empty E2 NODE CONFIGURATION UPDATE message (i.e. without any IE expect for *Message Type* IE and *Transaction ID* IE) shall be sent as the first E2AP procedure on the new TNLA, if the E2 Node does not have any Configuration to be updated to Near-RT RIC.

#### 8.3.6.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

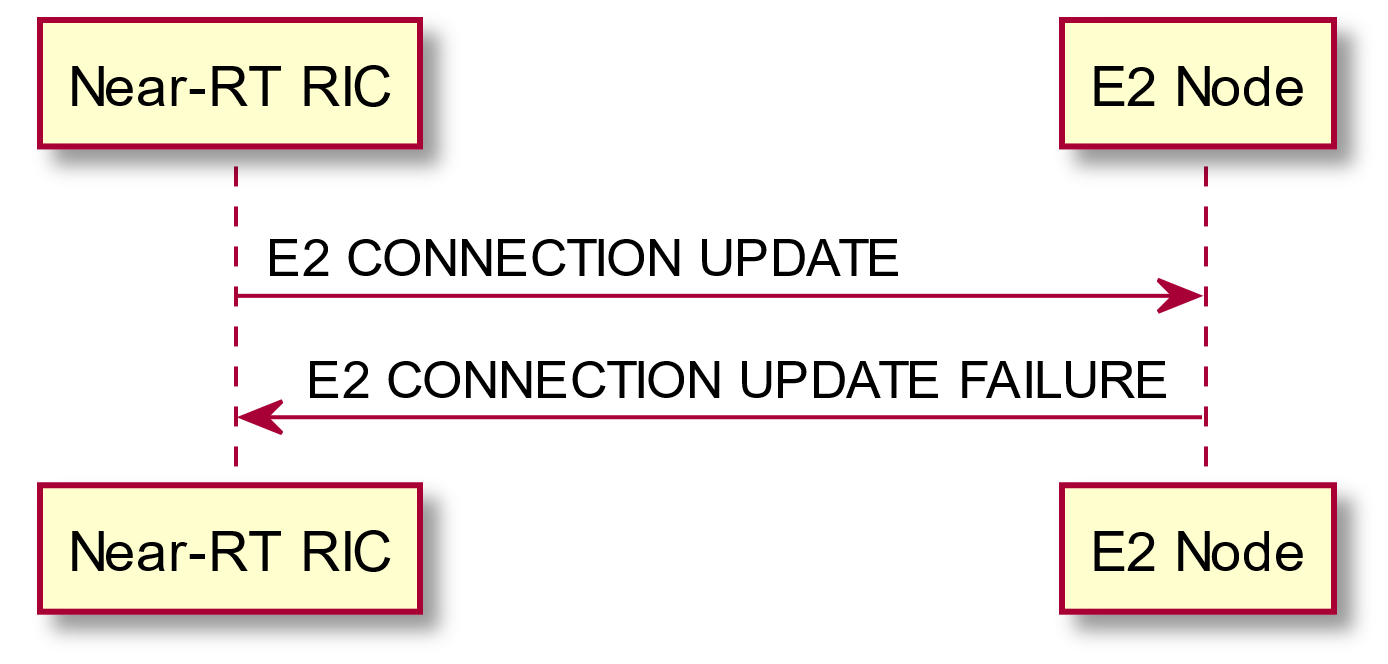
participant “Near-RT RIC” as near

participant “E2 Node” as ran

near->ran: E2 CONNECTION UPDATE

near<-ran: E2 CONNECTION UPDATE FAILURE

@enduml



**Figure 8.3.6.3-1: E2 Connection Update procedure, unsuccessful operation**

If the E2 Node cannot accept the update, it shall respond with a E2 CONNECTION UPDATE FAILURE message and appropriate cause value.

If the E2 CONNECTION UPDATE FAILURE message includes the *Time To Wait* IE, the Near-RT RIC shall wait at least for the indicated time before reinitiating the E2 Connection Update procedure towards the same E2 Node. Both nodes shall continue to operate with their existing connection(s).

#### 8.3.6.4 Abnormal Conditions

If the Near-RT RIC, after initiating E2 Connection Update procedure, receives neither the E2 CONNECTION UPDATE ACKNOWLEDGE message nor the E2 CONNECTION UPDATE FAILURE message, the Near-RT RIC may reinitiate the E2 Connection Update procedure towards the same E2 Node, provided that the content of the new E2 CONNECTION UPDATE message is identical to the content of the previously unacknowledged E2 CONNECTION UPDATE message.

### 8.3.7 E2 Removal procedure

#### 8.3.7.1 General

The purpose of the E2 removal procedure is to remove the E2 signaling connection between the Near-RT RIC and the E2 node in a controlled manner. If successful, this procedure erases any existing application level configuration data in the Near-RT RIC and the E2 node, respectively.

#### 8.3.7.2 Successful Operation

This procedure may be initiated by either Near-RT RIC or E2 Node.

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: E2 REMOVAL REQUEST

ran<-near: E2 REMOVAL RESPONSE

@enduml

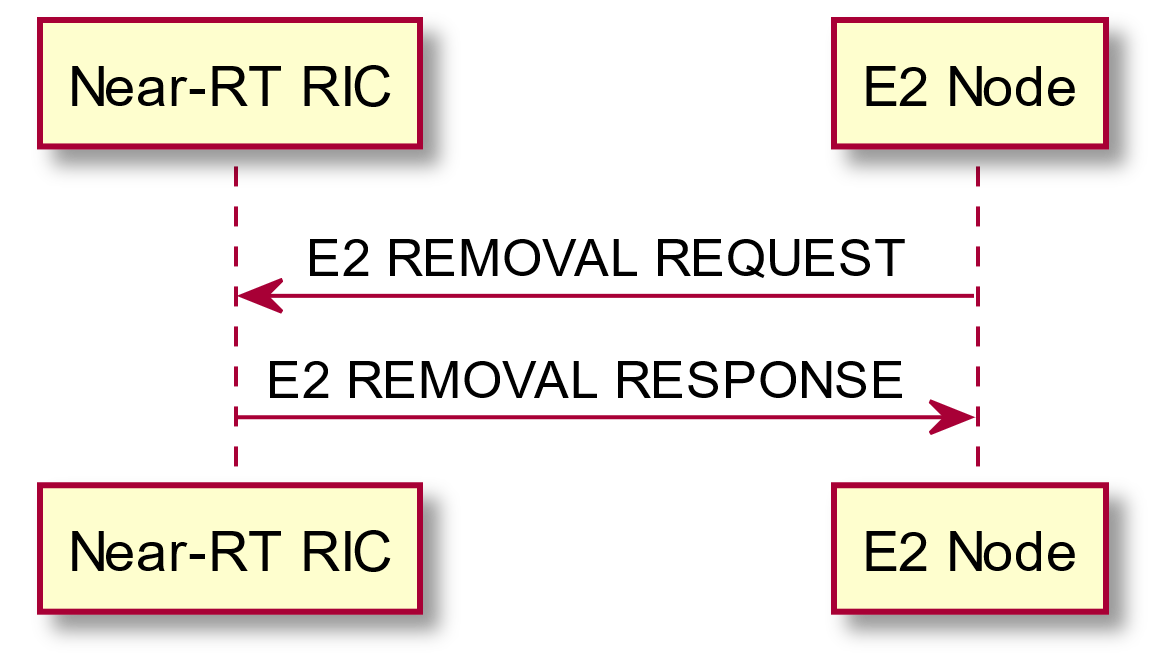


Figure 8.3.7.2-1: E2 Removal, successful operation (E2 Node Initiated)

@startuml

skin rose

skinparam ParticipantPadding 5

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran<-near: E2 REMOVAL REQUEST

ran->near: E2 REMOVAL RESPONSE

@enduml

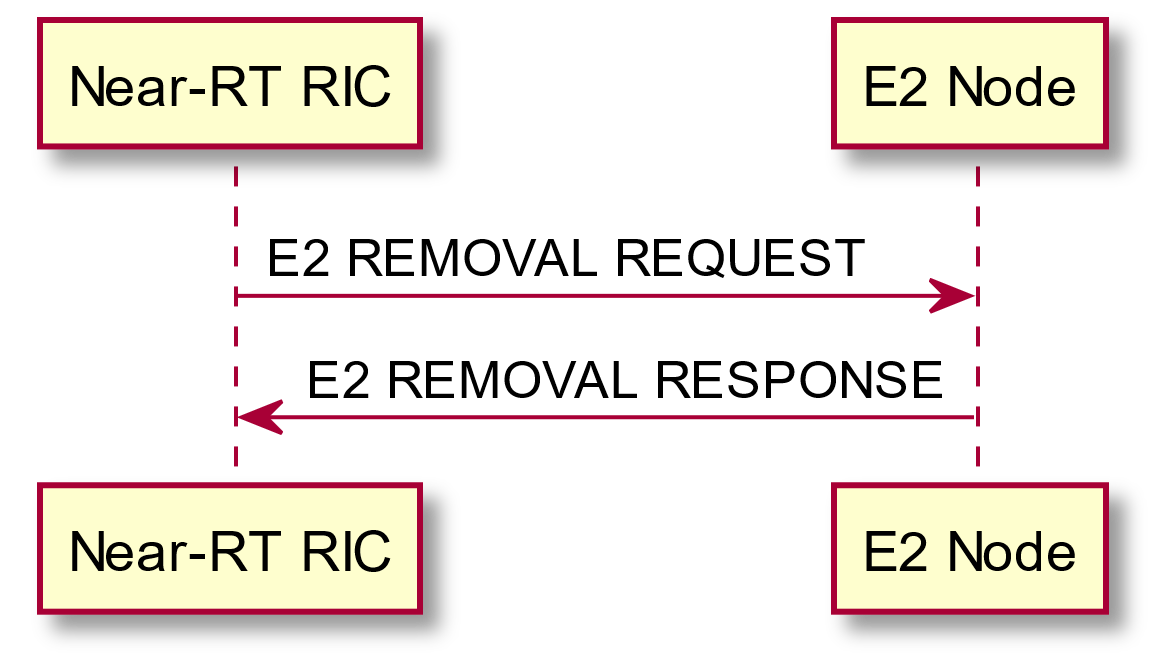


Figure 8.3.7.2-2: E2 Removal, successful operation (Near-RT RIC Initiated)

**Successful E2 Removal, E2 Node initiated**

The E2 Node initiates the procedure by sending the E2 REMOVAL REQUEST message to the Near-RT RIC. Upon reception of the E2 REMOVAL REQUEST message, the Near-RT RIC shall reply with the E2 REMOVAL RESPONSE message. After receiving the E2 REMOVAL RESPONSE message, the E2 Node shall initiate removal of the TNL association towards the Near-RT RIC, and shall remove all resources associated with that E2 signaling connection. The Near-RT RIC shall then remove all resources associated with that E2 signaling connection.

**Successful E2 Removal, Near-RT RIC initiated**

The Near-RT RIC initiates the procedure by sending the E2 REMOVAL REQUEST message to the E2 node. Upon reception of the E2 REMOVAL REQUEST message the E2 node shall reply with the E2 REMOVAL RESPONSE message. After receiving the E2 REMOVAL RESPONSE message, the Near-RT RIC may initiate removal of the TNL association towards the E2 node, and shall remove all resources associated with that E2 signaling connection. The E2 node shall then remove all resources associated with that E2 signaling connection.

**Interactions with other procedures:**

If the E2 REMOVAL REQUEST message is received, any other ongoing procedure on the same E2 interface related to ongoing RIC Services shall be aborted.

#### 8.3.7.3 Unsuccessful Operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran->near: E2 REMOVAL REQUEST

ran<-near: E2 REMOVAL FAILURE

@enduml

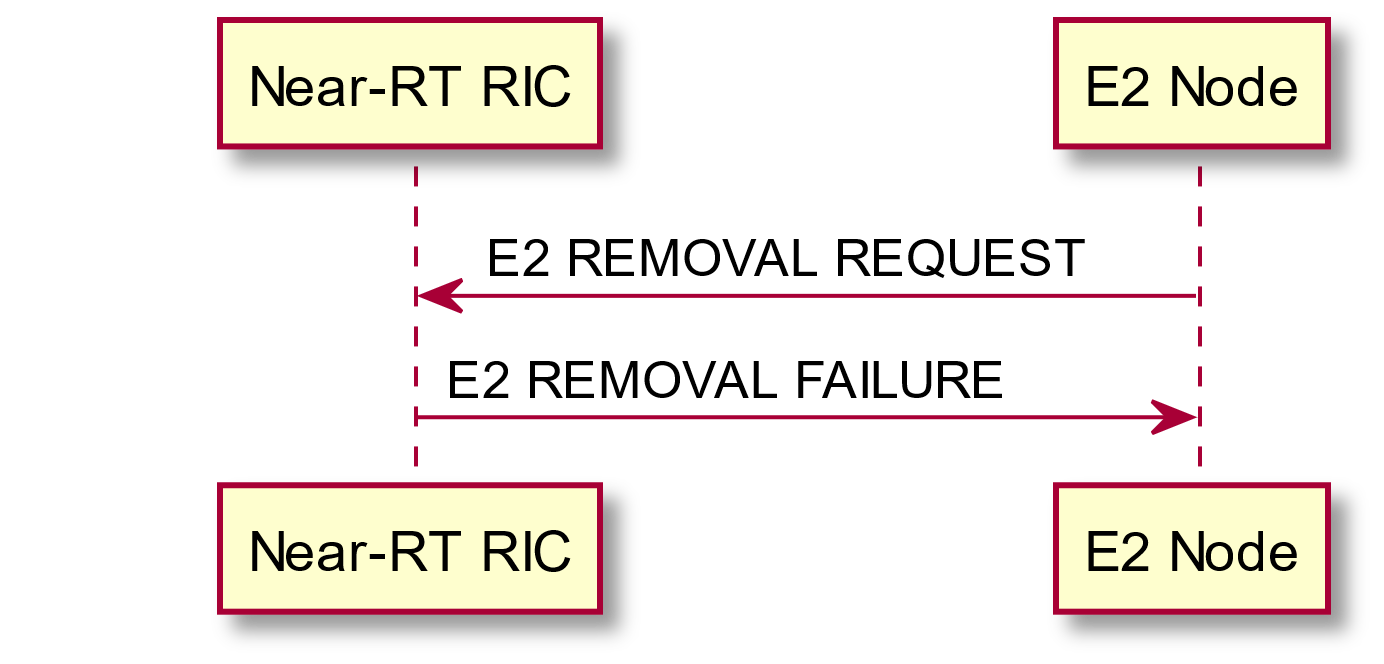


Figure 8.3.7.3-1: E2 Removal procedure (E2 Node Initiated), unsuccessful operation

@startuml

skin rose

skinparam ParticipantPadding 50

skinparam BoxPadding 10

skinparam lifelineStrategy solid

participant “Near-RT RIC” as near

participant “E2 Node” as ran

ran<-near: E2 REMOVAL REQUEST

ran->near: E2 REMOVAL FAILURE

@enduml

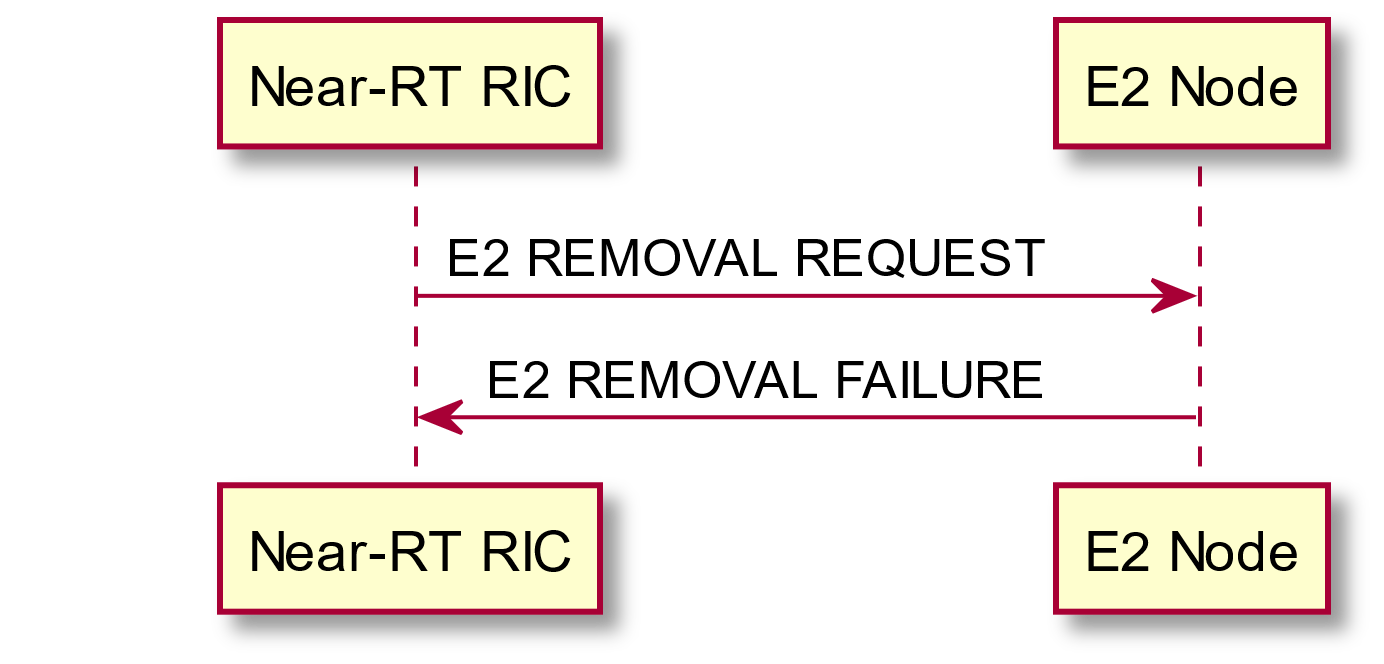


Figure 8.3.7.3-2: E2 Removal procedure (Near-RT RIC Initiated), unsuccessful operation

If the E2 Node cannot accept the E2 REMOVAL REQUEST it shall respond with E2 REMOVAL FAILURE message with an appropriate cause value.

If the Near-RT RIC cannot accept the E2 REMOVAL REQUEST it shall respond with E2 REMOVAL FAILURE message with an appropriate cause value.

#### 8.3.7.4 Abnormal Conditions

If the Near-RT RIC, after initiating E2 Removal procedure, receives neither the E2 REMOVAL RESPONSE message nor the E2 REMOVAL FAILURE message, the Near-RT RIC may reinitiate the E2 Removal procedure towards the same E2 Node, provided that the content of the new E2 REMOVAL REQUEST message is identical to the content of the previously unacknowledged E2 REMOVAL REQUEST message.

If the E2 Node, after initiating E2 Removal procedure, receives neither the E2 REMOVAL RESPONSE message nor the E2 REMOVAL FAILURE message, the E2 Node may reinitiate the E2 Removal procedure towards theNear-RT RIC, provided that the content of the new E2 REMOVAL REQUEST message is identical to the content of the previously unacknowledged E2 REMOVAL REQUEST message.

# 9 Elements for E2AP Communication

## 9.0 General

Sub clauses 9.1 and 9.2 describe the structure of the messages and information elements required for the E2AP protocol in tabular format. Sub clause 9.3 provides the corresponding ASN.1 definition.

The following attributes are used for the tabular description of the messages and information elements: Presence, Range Criticality and Assigned Criticality. Their definition and use can be found in TS 36.413 [24].

NOTE: The messages have been defined in accordance to the guidelines specified in TR 25.921 [14].

## 9.1 Message Functional Definition and Content

### 9.1.1 Messages for Near-RT RIC Functional Procedures

#### 9.1.1.1 RIC SUBSCRIPTION REQUEST

This message is sent by the Near-RT RIC to an E2 Node to create a new Subscription in the E2 Node.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| RIC Subscription Details | M |  |  |  | YES | reject |
| >RIC Event Trigger Definition | M |  | 9.2.9 |  | - |  |
| >Sequence of Actions |  | 1.. <maxofRICactionID> |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| >>RIC Action Type | M |  | 9.2.11 |  | - |  |
| >>RIC Action Definition | O |  | 9.2.12 |  | - |  |
| >>RIC Subsequent Action | O |  | 9.2.13 |  | - |  |
| >>RIC Action Execution Order | O |  | 9.2.35 | Used to define a specific execution order | - |  |
| RIC Subscription Start Time | O |  | 9.2.34 |  | YES | reject |
| RIC Subscription End Time | O |  | 9.2.34 |  | YES | reject |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRICActionID | Maximum no. of Actions to be requested by Near-RT RIC. Value is 16. |

#### 9.1.1.2 RIC SUBSCRIPTION RESPONSE

This message is sent by the E2 Node to accept the request from the Near-RT RIC to create a new Subscription in the E2 Node.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| RIC Actions Admitted List |  | 1.. <maxofRICactionID> |  |  | YES | reject |
| >RIC Action ID | M |  | 9.2.10 |  | - |  |
| RIC Actions Not Admitted List |  | 0.. <maxofRICactionID> |  |  | YES | reject |
| >RIC Action ID | M |  | 9.2.10 |  | - |  |
| >Cause | M |  | 9.2.1 |  | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRICActionID | Maximum no. of Actions to be requested by Near-RT RIC. Value is 16. |

#### 9.1.1.3 RIC SUBSCRIPTION FAILURE

This message is sent by the E2 Node to inform the Near-RT RIC that the request to create a new Subscription in the E2 Node failed.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.4 RIC SUBSCRIPTION DELETE REQUEST

This message is sent by the Near-RT RIC to an E2 Node to request the deletion of an existing Subscription in the E2 Node previously created for the Near-RT RIC.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |

#### 9.1.1.5 RIC SUBSCRIPTION DELETE RESPONSE

This message is sent by the E2 Node to accept the request from a Near-RT RIC to delete an existing Subscriptionin the E2 Node

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |

#### 9.1.1.6 RIC SUBSCRIPTION DELETE FAILURE

This message is sent by the E2 Node to inform the Near-RT RIC that the request to delete an existing Subscription in the E2 Node failed.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.6A RIC SUBSCRIPTION DELETE REQUIRED

This message is sent by the E2 Node to request deletion of the existing RIC Subscriptions in the E2 Node previously created for the Near-RT RIC.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| List of RIC Subscriptions To Be Removed |  | *1.. <maxofRICrequestID>* |  |  | EACH | ignore |
| >RIC Request ID | M |  | 9.2.7 |  | - | - |
| >RAN Function ID | M |  | 9.2.8 |  | - | - |
| >Cause | M |  | 9.2.1 |  | - | - |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRICrequestID | Maximum no. of RIC subscription requests supported by Near-RT RIC toward an E2 Node. Value is <1024>. |

#### 9.1.1.7 RIC INDICATION

This message is sent by an E2 Node to transfer Report information to a Near-RT RIC.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| RIC Action ID | M |  | 9.2.10 |  | YES | reject |
| RIC Indication SN | O |  | 9.2.14 |  | YES | reject |
| RIC Indication Type | M |  | 9.2.15 |  | YES | reject |
| RIC Indication Header | M |  | 9.2.17 |  | YES | reject |
| RIC Indication Message | M |  | 9.2.16 |  | YES | reject |
| RIC Call process ID | O |  | 9.2.18 |  | YES | reject |

#### 9.1.1.8 RIC CONTROL REQUEST

This message is sent by a Near-RT RIC to an E2 Node to initiate or resume a control function logic.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| RIC Call Process ID | O |  | 9.2.18 |  | YES | reject |
| RIC Control Header | M |  | 9.2.20 |  | YES | reject |
| RIC Control Message | M |  | 9.2.19 |  | YES | reject |
| RIC Control Ack Request | O |  | 9.2.21 |  | YES | reject |

#### 9.1.1.9 RIC CONTROL ACKNOWLEDGE

This message is sent by the E2 Node to inform the Near-RT RIC that the RIC CONTROL REQUEST message was received and to provide information on the outcome of the request.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| RIC Call process ID | O |  | 9.2.18 |  | YES | reject |
| RIC Control Outcome | O |  | 9.2.25 |  | YES | reject |

#### 9.1.1.10 RIC CONTROL FAILURE

This message is sent by the E2 Node to inform the Near-RT RIC that the RIC CONTROL REQUEST message has failed to be executed.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| RIC Call process ID | O |  | 9.2.18 |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| RIC Control Outcome | O |  | 9.2.25 |  | YES | Reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.11 RIC SUBSCRIPTION MODIFICATION REQUEST

This message is sent by the Near-RT RIC to an E2 Node to modify an existing Subscription in the E2 Node.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** | |
| Message Type | M |  | 9.2.3 |  | YES | reject | |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject | |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject | |
| RIC Event Trigger Definition to be Modified | O |  | 9.2.9 |  | YES | ignore | |
| **RIC Actions to be Removed List** |  | *0..1* |  |  | YES | ignore | |
| **>Action to be Removed Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore | |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  | |
| **RIC Actions to be Modified List** |  | *0..1* |  |  | YES | ignore | |
| >**Action to be Modified Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore | |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  | |
| >>RIC Action Definition | O |  | 9.2.12 |  | - |  | |
| >>RIC Action Execution Order | O |  | 9.2.X |  |  |  |
| >>RIC Subsequent Action | O |  | 9.2.13 |  | - |  | |
| **RIC Actions to be Added List** |  | *0..1* |  |  | YES | ignore | |
| >**Action to be Added Item IEs** |  | *1..*<*maxofRICactionID*> |  |  | EACH | ignore | |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  | |
| >>RIC Action Type | M |  | 9.2.11 |  | - |  | |
| >>RIC Action Definition | M |  | 9.2.12 |  | - |  | |
| >>RIC Action Execution Order | M |  | 9.2.X |  |  |  | |
| >>RIC Subsequent Action | O |  | 9.2.13 |  | - |  | |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRICActionID | Maximum no. of Actions to be requested by Near-RT RIC. Value is 16. |

#### 9.1.1.12 RIC SUBSCRIPTION MODIFICATION RESPONSE

This message is sent by the E2 Node to accept the request from the Near-RT RIC to modify an existing E2 subscription in the E2 Node.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| **RIC Actions Removed List** |  | *0..1* |  |  | YES | ignore |
| **>Action Removed Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| **RIC Actions Failed to be Removed List** |  | *0..1* |  |  | YES | ignore |
| **>Action Failed to be Removed Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| >>Cause | M |  | 9.2.1 |  | - |  |
| **RIC Actions Modified List** |  | *0..1* |  |  | YES | ignore |
| **>Action Modified Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| **RIC Actions Failed to be Modified List** |  | *0..1* |  |  | YES | ignore |
| **>Action Failed to be Modified Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| >>Cause | M |  | 9.2.1 |  | - |  |
| **RIC Actions Added List** |  | *0..1* |  |  | YES | ignore |
| **>Action Added Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| **RIC Actions Failed to be Added List** |  | *0..1* |  |  | YES | ignore |
| >**Action Failed to be Added Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | Ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| >>Cause | M |  | 9.2.1 |  | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRICActionID | Maximum no. of Actions to be requested by Near-RT RIC. Value is 16. |

#### 9.1.1.13 RIC SUBSCRIPTION MODIFICATION FAILURE

This message is sent by the E2 Node to inform the Near-RT RIC that the request to modify an existing E2 subscription in the E2 Node failed.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.14 RIC SUBSCRIPTION MODIFICATION REQUIRED

This message is sent by the E2 Node to request the Near-RT RIC to modify an existing E2 subscription in the E2 Node.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| **RIC Actions Required to be Modified List** |  | *0..1* |  |  | YES | ignore |
| >**Action Required to be Modified Item IEs** |  |  |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| >>RIC Time to Wait before subsequent action | M |  | ENUMERATED (1ms, 2ms, 5ms, 10ms, 20ms, 30ms, 40ms, 50ms, 100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 20s, 60s, …) |  | - |  |
| **RIC Actions Required to be Removed List** |  | *0..1* |  |  | YES | ignore |
| **>Action Required to be Removed Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| >>Cause | M |  | 9.2.1 |  | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRICActionID | Maximum no. of Actions to be requested by Near-RT RIC. Value is 16. |

#### 9.1.1.15 RIC SUBSCRIPTION MODIFICATION CONFIRM

This message is sent by the Near-RT RIC to accept the request from the E2 Node to modify an existing E2 subscription in the E2 Node.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| **RIC Actions Confirmed for Modification List** |  | *0..1* |  |  | YES | ignore |
| **>RIC Action Confirmed for Modification Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| **RIC Actions Refused to be Modified List** |  | *0..1* |  |  | YES | ignore |
| **>Action Refused to be Modified Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| >>Cause | M |  | 9.2.1 |  | - |  |
| **RIC Actions Confirmed for Removal List** |  | *0..1* |  |  | YES | ignore |
| **>Action Confirmed for Removal Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| **RIC Actions Refused to be Removed List** |  | *0..1* |  |  | YES | ignore |
| **>Action Refused to be Removed Item IEs** |  | *1..<maxofRICactionID>* |  |  | EACH | ignore |
| >>RIC Action ID | M |  | 9.2.10 |  | - |  |
| >>Cause | M |  | 9.2.1 |  | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRICActionID | Maximum no. of Actions to be requested by Near-RT RIC. Value is 16. |

#### 9.1.1.16 RIC SUBSCRIPTION MODIFICATION REFUSE

This message is sent by the Near-RT RIC to deny the request from the E2 Node to modify an existing E2 subscription in the E2 Node.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.17 RIC QUERY REQUEST

This message is sent by the Near-RT RIC to an E2 Node to request RAN and/or UE related information from the E2 Node.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| RIC Query Header | M |  | 9.2.36 |  | YES | reject |
| RIC Query Definition | M |  | 9.2.37 |  | YES | reject |

#### 9.1.1.18 RIC QUERY RESPONSE

This message is sent by the E2 Node to Near-RT RIC in response to RAN and/or UE related information requested by Near-RT RIC.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| RIC Query Outcome | M |  | 9.2.38 |  | YES | reject |

#### 9.1.1.19 RIC QUERY FAILURE

This message is sent by the E2 Node to inform the Near-RT RIC that the requested RAN and/or UE related Information has failed.

Direction: E2 Node → Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| RIC Request ID | M |  | 9.2.7 |  | YES | reject |
| RAN Function ID | M |  | 9.2.8 |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

### 9.1.2 Messages for Global Procedures

#### 9.1.2.1 ERROR INDICATION

This message is used to indicate that some error has been detected in the E2 Node or Near-RT RIC.

Direction: E2 Node → Near-RT RIC or Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3 |  | YES | ignore |
| Transaction ID | O |  | 9.2.33 | Required if *RIC Request ID* IE is not present | YES | reject |
| RIC Request ID | O |  | 9.2.7 | Required if *Transaction ID* IE is not present | YES | reject |
| RAN Function ID | O |  | 9.2.8 |  | YES | reject |
| Cause | O |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.2.2 E2 SETUP REQUEST

This message is sent by an E2 Node to a Near-RT RIC to transfer the initialization information.

Direction: E2 Node 🡪 Near-RT RIC

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** | |
| Message Type | M |  | 9.2.3 |  | YES | reject | |
| Transaction ID | M |  | 9.2.33 | . | YES | reject | |
| Global E2 Node ID | M |  | 9.2.6 |  | YES | reject | |
| **RAN Functions Added List** |  | *1* |  | List of RAN functions in E2 node | YES | reject | |
| >RAN Function item |  | *1.. <maxofRANfunctionID>* |  |  |  |  | |
| >>RAN Function ID | M |  | 9.2.8 | Id of the declared Function | - |  | |
| >>RAN Function Definition | M |  | 9.2.23 | Definition of Function | - |  | |
| >>RAN Function Revision | M |  | 9.2.24 | Revision counter | - |  | |
| >>RAN Function OID | M |  | 9.2.31 | Object identifier of corresponding E2SM | - |  | |
| **E2 Node Component Configuration Addition List** |  | *1* |  | List of E2 Node component configuration information | YES | reject |
| >E2 Node Component Configuration Addition Item |  | *1.. <maxofE2nodeComponents>* |  |  | EACH | reject |
| >>E2 Node Component Interface Type | M |  | 9.2.26 | E2 Node component interface type | - |  |
| >>E2 Node Component ID | O |  | 9.2.32 | E2 Node Component Identifier | - |  |
| >>E2 Node Component Configuration | M |  | 9.2.27 | Contents depends on component interface type | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRANfunctionID | Maximum no. of RAN Functions supported by E2 Node. Value is 256. |
| maxofE2nodeComponents | Maximum no. of E2 Node components supported by E2 Node. Value is 1024 |

#### 9.1.2.3 E2 SETUP RESPONSE

This message is sent by a Near-RT RIC to an E2 Node to transfer the initialization information.

Direction: Near-RT RIC →E2 Node

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| Global RIC ID | M |  | 9.2.4 |  | YES | reject |
| **RAN Functions Accepted List** |  | *0..1* |  | Complete list of Functions accepted by Near-RT RIC |  |  |
| >RAN Functions ID item |  | *1 .. <maxofRANfunctionID>* |  |  | YES | Reject |
| >>RAN Function ID | M |  | 9.2.8 | Id of the declared Function | - |  |
| >>RAN Function Revision | M |  | 9.2.24 | Revision counter | - |  |
| **RAN Functions Rejected List** |  | *0..1* |  | Complete list of Functions not accepted by Near-RT RIC |  |  |
| RAN Functions ID Cause Item |  | *1 .. <maxofRANfunctionID>* |  |  | YES | reject |
| >>RAN Function ID | M |  | 9.2.8 | Id of the declared Function | - |  |
| >>Cause | M |  | 9.2.1 | Reason for not accepting function | - |  |
| **E2 Node Component Configuration Addition Acknowledge List** |  | *1* |  | Complete list of E2 Node Components in the E2 SETUP REQUEST message | YES | reject |
| >E2 Node Component Configuration Addition Acknowledge Item |  | *1.. <maxofE2nodeComponents>* |  |  | EACH | reject |
| >>E2 Node Component Interface Type | M |  | 9.2.26 | E2 Node component interface type | - |  |
| >>E2 Node Component ID | M |  | 9.2.32 | E2 Node Component Identifier | - |  |
| >>E2 Node Component Configuration Acknowledge | M |  | 9.2.28 | Success or failure with Cause | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRANfunctionID | Maximum no. of RAN Functions supported by E2 Node. Value is 256. |
| maxofE2nodeComponents | Maximum no. of E2 Node components supported by E2 Node. Value is 1024 |

#### 9.1.2.4 E2 SETUP FAILURE

This message is sent by the Near-RT RIC to indicate E2 Setup failure.

Direction: Near-RT RIC → E2 Node

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Time To Wait | O |  | 9.2.5 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | Ignore |
| Transport Layer Information | O |  | 9.2.29 |  | YES | ignore |

#### 9.1.2.5 RESET REQUEST

This message is sent from a Near-RT RIC to an E2 Node or from an E2 Node to a Near-RT RIC and is used to request the E2 interface between the E2 node and the Near-RT RIC to be reset.

Direction: Near-RT RIC → E2 Node, or E2 Node → Near-RT RIC

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M | |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | | 9.2.33 | . | YES | reject |
| Cause | M | |  | 9.2.1 |  | YES | ignore |

#### 9.1.2.6 RESET RESPONSE

This message is sent by an E2 Node to a Near-RT RIC or from a Near-RT RIC to an E2 Node as a response to a RESET REQUEST message.

Direction: Near-RT RIC → E2 Node, or E2 Node → Near-RT RIC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.2.7 RIC SERVICE UPDATE

This message is sent by an E2 Node to the Near-RT RIC to transfer updated information on RIC Services supported by the E2 Node.

Direction: E2 Node → Near-RT RIC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| **RAN Functions Added List** |  | *0..1* |  | List of added RAN functions in E2 node |  |  |
| >RAN Functions Item |  | *1 .. <maxofRANfunctionID>* |  |  | YES | reject |
| >>RAN Function ID | M |  | 9.2.8 | Id of the declared Function | - |  |
| >>RAN Function Definition | M |  | 9.2.23 | Definition of Function | - |  |
| >>RAN Function Revision | M |  | 9.2.24 | Revision counter | - |  |
| >>RAN Function OID | M |  | 9.2.31 | Object identifier of corresponding E2SM | - |  |
| **RAN Functions Modified List** |  | *0..1* |  | List of Modified RAN functions in E2 node |  |  |
| >RAN Functions Item |  | *1 .. <maxofRANfunctionID>* |  |  | YES | reject |
| >>RAN Function ID | M |  | 9.2.8 | Id of the declared Function | - |  |
| >>RAN Function Definition | M |  | 9.2.23 | Definition of Function | - |  |
| >>RAN Function Revision | M |  | 9.2.24 | Revision counter | - |  |
| >>RAN Function OID | M |  | 9.2.31 | Object identifier of corresponding E2SM | - |  |
| **RAN Functions Deleted List** |  | *0..1* |  | List of deleted RAN functions in E2 node |  |  |
| >RAN Functions ID Item |  | *1 .. <maxofRANfunctionID>* |  |  | YES | reject |
| >>RAN Function ID | M |  | 9.2.8 | Id of the declared Function | - |  |
| >>RAN Function Revision | M |  | 9.2.24 | Revision counter | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRANfunctionID | Maximum no. of Functions accepted by Near-RT RIC. Value is 256. |

#### 9.1.2.8 RIC SERVICE UPDATE ACKNOWLEDGE

This message is sent by the Near-RT RIC to the E2 Node to acknowledge update of RIC Services supported by the E2 Node.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | | M |  | 9.2.33 | . | YES | reject |
| **RAN Functions Accepted List** |  | | *0..1* |  | List of Functions accepted by Near-RT RIC |  |  |
| >RAN Functions ID Item |  | | *1 .. <maxofRANfunctionID>* |  |  | YES | reject |
| >>RAN Function ID | M | |  | 9.2.8 | Id of the declared Function | - |  |
| >>RAN Function Revision | | M |  | 9.2.24 | Revision counter | - |  |
| **RAN Functions Rejected List** |  | | *0..1* |  | List of Functions not accepted by Near-RT RIC |  |  |
| >RAN Functions Cause Item |  | | *1 .. <maxofRANfunctionID>* |  |  | YES | reject |
| >>RAN Function ID | M | |  | 9.2.8 | Id of the declared Function | - |  |
| >>Cause | M | |  | 9.2.1 | Reason for not accepting function | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRANfunctionID | Maximum no. of Functions accepted by Near-RT RIC. Value is 256. |

#### 9.1.2.9 RIC SERVICE UPDATE FAILURE

This message is sent by the Near-RT RIC to the E2 Node to indicate RIC SERVICE Update Failure.

Direction: Near-RT RIC → E2 Node

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| Cause | M |  | 9.2.1 | Reason for failure | YES | reject |
| Time To Wait | O |  | 9.2.5 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.2.10 RIC SERVICE QUERY

This message is sent by a Near-RT RIC to an E2 Node to request a E2 Node initiated RIC Service Update procedure.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | | M |  | 9.2.33 | . | YES | reject |
| **RAN Functions Accepted List** |  | | *0..1* |  | Complete list of Functions previously accepted by Near-RT RIC |  |  |
| >RAN Functions ID Item |  | | *1 .. <maxofRANfunctionID>* |  |  | YES | reject |
| >>RAN Function ID | M | |  | 9.2.8 | Id of the declared Function | - |  |
| >>RAN Function Revision | M | |  | 9.2.24 | Revision counter | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofRANfunctionID | Maximum no. of Functions accepted by Near-RT RIC. Value is 256. |

#### 9.1.2.11 E2 NODE CONFIGURATION UPDATE

This message is sent by an E2 Node to the Near-RT RIC to transfer updated information on the E2 Node Configuration information.

Direction: E2 Node → Near-RT RIC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 |  | YES | reject |
| Global E2 Node ID | O |  | 9.2.6 | Required when sent as first message on new TNL association | YES | reject |
| **E2 Node Component Configuration Addition List** |  | *0..1* |  |  | YES | reject |
| >E2 Node Component Configuration Addition Item |  | *1.. <maxofE2nodeComponents>* |  |  | EACH | reject |
| >>E2 Node Component Interface Type | M |  | 9.2.26 | E2 Node component interface type | - |  |
| >>E2 Node Component ID | M |  | 9.2.32 | E2 Node Component Identifier | - |  |
| >>E2 Node Component Configuration | M |  | 9.2.27 | Contents depends on component type | - |  |
| **E2 Node Component Configuration Update List** |  | *0..1* |  |  | YES | reject |
| >E2 Node Component Configuration Update Item |  | *1.. <maxofE2nodeComponents>* |  |  | EACH | reject |
| >>E2 Node Component Interface Type | M |  | 9.2.26 | E2 Node component interface type | - |  |
| >>E2 Node Component ID | M |  | 9.2.32 | E2 Node Component Identifier | - |  |
| >>E2 Node Component Configuration | M |  | 9.2.27 | Contents depends on component type | - |  |
| **E2 Node Component Configuration Removal List** |  | *0..1* |  |  | YES | reject |
| >E2 Node Component Configuration Removal Item |  | *1.. <maxofE2nodeComponents>* |  |  | EACH | reject |
| >>E2 Node Component Interface Type | M |  | 9.2.26 | E2 Node component interface type | - |  |
| >>E2 Node Component ID | M |  | 9.2.32 | E2 Node Component Identifier | - |  |
| **E2 Node TNL Association To Remove List** |  | *0..1* |  |  | YES | reject |
| >E2 Node TNL Association To Remove Item IEs |  | *1..<maxofTNLA>* |  |  | EACH | reject |
| >> Transport Layer Information | M |  | 9.2.29 | Transport Layer Address of the E2 node. | - | - |
| >> Transport Layer Information Near-RT RIC | O |  | 9.2.29 | Transport Layer Address of the Near-RT RIC. | - | - |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofE2nodeComponents | Maximum no. of E2 Node components supported by E2 Node. Value is 1024. |
| maxofTNLA | Maximum no. of TNL Associations supported by E2 Node. Value is 32. |

#### 9.1.2.12 E2 NODE CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by Near-RT RIC to E2 Node to acknowledge update of E2 Node Configuration supported by the E2 Node.

Direction: Near-RT RIC → E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| **E2 Node Component Configuration Addition Acknowledge List** |  | *0..1* |  |  | YES | reject |
| >E2 Node Component Configuration Addition Acknowledge Item |  | *1.. <maxofE2nodeComponents>* |  |  | EACH | reject |
| >>E2 Node Component Interface Type | M |  | 9.2.26 | E2 Node component interface type | - |  |
| >>E2 Node Component ID | M |  | 9.2.32 | E2 Node Component Identifier | - |  |
| >>E2 Node Component Configuration Acknowledge | M |  | 9.2.28 | Success or failure with Cause | - |  |
| **E2 Node Component Configuration Update Acknowledge List** |  | *0..1* |  |  | YES | reject |
| >E2 Node Component Configuration Update Acknowledge Item |  | *1.. <maxofE2nodeComponents>* |  |  | EACH | reject |
| >>E2 Node Component Interface Type | M |  | 9.2.26 | E2 Node component interface type | - |  |
| >>E2 Node Component ID | O |  | 9.2.32 | E2 Node Component Identifier | - |  |
| >>E2 Node Component Configuration Update Acknowledge | M |  | 9.2.28 | Success or failure with Cause | - |  |
| **E2 Node Component Configuration Removal Acknowledge List** |  | *0..1* |  |  | YES | reject |
| >E2 Node Component Configuration Removal Acknowledge Item |  | *1.. <maxofE2nodeComponents>* |  |  | EACH | reject |
| >>E2 Node Component Interface Type | M |  | 9.2.26 | E2 Node component interface type | - |  |
| >>E2 Node Component ID | M |  | 9.2.32 | E2 Node Component Identifier | - |  |
| >>E2 Node Component Configuration Acknowledge | M |  | 9.2.28 | Success or failure with Cause | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofE2nodeComponents | Maximum no. of E2 Node components supported by E2 Node. Value is 1024. |

#### 9.1.2.13 E2 NODE CONFIGURATION UPDATE FAILURE

This message is sent by Near-RT RIC to E2 Node to indicate E2 Node Configuration Update Failure.

Direction: Near-RT RIC → E2 Node

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| Cause | M |  | 9.2.1 | Cause | YES | reject |
| Time To Wait | O |  | 9.2.5 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.2.14 E2 CONNECTION UPDATE

This message is sent by Near-RT RIC to E2 Node to initiate update of E2 Connection supported by the E2 Node.

Direction: Near-RT RIC  E2 Node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| **E2 Connection To Add List** |  | *0..1* |  |  | YES | ignore |
| >E2 Connection to Add Item IEs |  | *1.. <maxofTNLA>* |  |  | EACH | ignore |
| >>Transport Layer Information | M |  | 9.2.29 | Transport layer address and port number of Near-RT RIC |  |  |
| >>TNL Association Usage | M |  | 9.2.30 | Indicates how E2 connection is to be used |  |  |
| **E2 Connection To Remove List** |  | *0..1* |  |  | YES | ignore |
| >E2 Connection to Remove Item IEs |  | *1.. <maxofTNLA>* |  |  | EACH | ignore |
| >>Transport Layer Information | M |  | 9.2.29 | Transport layer address and port number of Near-RT RIC |  |  |
| **E2 Connection To Modify List** |  | *0..1* |  |  | YES | ignore |
| >E2 Connection to Modify Item IEs |  | *1.. <maxofTNLA>* |  |  | EACH | ignore |
| >>Transport Layer Information | M |  | 9.2.29 | Transport layer address and port number of Near-RT RIC |  |  |
| >>TNL Association Usage | M |  | 9.2.30 | Indicates how E2 connection is to be used |  |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofTNLA | Maximum no. of TNL Associations supported by E2 Node. Value is 32. |

#### 9.1.2.15 E2 CONNECTION UPDATE ACKNOWLEDGE

This message is sent by E2 Node to the Near-RT RIC to acknowledge update of E2 Connection supported by the E2 Node.

Direction: E2 Node  Near-RT RIC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| **E2 Connection Setup List** |  | *0..1* |  |  | YES | ignore |
| >E2 Connection Setup Item IEs |  | *1.. <maxofTNLA>* |  |  | EACH | ignore |
| >>Transport Layer Information | M |  | 9.2.29 | Transport layer address and port number of Near-RT RIC |  |  |
| >>TNL Association Usage | M |  | 9.2.30 | Indicates how E2 connection is to be used |  |  |
| **E2 Connection Failed to Setup List** |  | *0..1* |  |  | YES | ignore |
| >E2 Connection failed to setup Item IEs |  | *1.. <maxofTNLA>* |  |  | EACH | ignore |
| >>Transport Layer Information | M |  | 9.2.29 | Transport layer address and port number of Near-RT RIC |  |  |
| >>Cause | M |  | 9.2.1 |  |  |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxofTNLA | Maximum no. of TNL Associations supported by E2 Node. Value is 32. |

#### 9.1.2.16 E2 CONNECTION UPDATE FAILURE

This message is sent by E2 Node to the Near-RT RIC to inform failure of the requested E2 Connection updates.

Direction: E2 Node  Near-RT RIC.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M | |  | 9.2.3 |  | YES | reject |
| Transaction ID | M | |  | 9.2.33 | . | YES | reject |
| Cause | M | |  | 9.2.1 |  | YES | reject |
| Time To Wait | | O |  | 9.2.5 |  | YES | ignore |
| Criticality Diagnostics | | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.2.17 E2 REMOVAL REQUEST

This message is sent by either the E2 Node or the Near-RT RIC to initiate the removal of the E2 signaling connection and the related resources.

Direction: Near-RT RIC → E2 Node, or E2 Node → Near-RT RIC

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M | |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | | 9.2.33 |  | YES | reject |

#### 9.1.2.18 E2 REMOVAL RESPONSE

This message is sent by either the E2 Node or the Near-RT RIC to acknowledge the initiation of removal of the E2 signaling connection and the related resources.

Direction: Near-RT RIC → E2 Node, or E2 Node → Near-RT RIC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.2.19 E2 REMOVAL FAILURE

This message is sent by either the E2 Node or the Near-RT RIC to indicate that removing the E2 signaling connection and the related resources cannot be accepted.

Direction: Near-RT RIC → E2 Node, or E2 Node → Near-RT RIC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| Transaction ID | M |  | 9.2.33 | . | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

## 9.2 Information Element definitions

### 9.2.0 General

When specifying information elements which are to be represented by bit strings, if not otherwise specifically stated in the semantics description of the concerned IE or elsewhere, the following principle applies with regards to the ordering of bits:

- The first bit (leftmost bit) contains the most significant bit (MSB);

- The last bit (rightmost bit) contains the least significant bit (LSB);

- When importing bit strings from other specifications, the first bit of the bit string contains the first bit of the concerned information.

### 9.2.1 Cause

The purpose of the *Cause* IE is to indicate the reason for a particular event for the E2AP protocol.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE Type and Reference** | **Semantics Description** |
| CHOICE *Cause Group* | M |  |  |  |
| >RIC services |  |  |  |  |
| >>RIC Request | O |  | ENUMERATED (RAN Function ID invalid,  Action not supported,  Excessive actions,  Duplicate action,  Duplicate Event Trigger,  Function resource limit,  RIC Request ID unknown,  Inconsistent Action/subsequent Action sequence,  Control message invalid,  RIC Call process ID invalid,  Control timer expired,  Control failed to execute,  System not ready,  unspecified, …, RIC Subscription End Time expired,  RIC Subscription Time invalid, Duplicate RIC Request ID, Event Trigger not supported, Requested Information Unavailable, Invalid Information Request) |  |
| >>RIC Service | O |  | ENUMERATED RAN Function not supported,  Excessive functions,  RIC resource limit,…) |  |
| >>E2 Node | O |  | ENUMERATED  (E2 node component unknown, …) |  |
| *>Transport Layer* |  |  |  |  |
| >>Transport Layer Cause | M |  | ENUMERATED (Unspecified,  Transport Resource Unavailable, ...) |  |
| *>Protocol* |  |  |  |  |
| >>Protocol Cause | M |  | ENUMERATED (Transfer Syntax Error, Abstract Syntax Error (Reject), Abstract Syntax Error (Ignore and Notify), Message not Compatible with Receiver State, Semantic Error, Abstract Syntax Error (Falsely Constructed Message), Unspecified, ...) |  |
| *>Misc* |  |  |  |  |
| >>Miscellaneous Cause | M |  | ENUMERATED (Control Processing Overload,  Hardware Failure, O&M Intervention, Unspecified, ...) |  |

The meaning of the different cause values is described in the following table. In general, "not supported" cause values indicate that the related capability is missing. On the other hand, "not available" cause values indicate that the related capability is present, but insufficient resources were available to perform the requested action.

|  |  |
| --- | --- |
| RIC Request cause | Meaning |
| Unspecified | Sent for RIC service cause when none of the specified cause values applies. |
| RAN Function ID invalid | Requested function Id invalid or not known by E2 Node |
| Action not supported | Requested Action not supported by RAN function |
| Excessive actions | Excessive number of actions requested for RAN Function |
| Duplicate action | Same action requested more than once in same subscription request |
| Duplicate Event Trigger | Subscription request has same event trigger as previously accepted subscription request |
| Function resource limit | RAN function has reached resource limit |
| RIC Request ID unknown | RIC Request ID sent to Near-RT RIC is unknown |
| Inconsistent Action/subsequent Action sequence | RAN Function has detected inconsistent sequence of requested Action and Subsequent Action |
| Control message invalid | RAN Function has detected invalid RIC CONTROL REQUEST message |
| RIC Call process ID invalid | RAN function has detected invalid RIC Call Process ID in RIC CONTROL REQUEST |
| Control timer expired | RIC Control Request received by E2 Node after the associated RIC Time to Wait timer had expired |
| Control failed to execute | Requested control procedure initiated by RIC Control Request failed to be executed in the E2 Node |
| System not ready | RAN Function is not ready to receive RIC Subscription or RIC Control message |
| RIC Subscription End Time expired | RIC SUBSCRIPTION DELETE REQUIRED is triggered to inform Near-RT RIC that end time has expired. |
| RIC Subscription Time invalid | E2 Node received RIC SUBSCRIPTION REQUEST containing an invalid RIC Subscription Start Time and/or RIC Subscription End Time. |
| Duplicate RIC Request ID | E2 node does not support handling of same RIC Request ID as previously accepted subscription request |
| Event Trigger not supported | Requested event trigger definition or modification - not supported by RAN function |
| Requested Information Unavailable | Information requested by Near-RT RIC is not available at E2 Node |
| Invalid Information Request | Information requested by Near-RT RIC is invalid |

|  |  |
| --- | --- |
| RIC Service cause | Meaning |
| RAN Function not supported | The RAN Function described by E2 Node is not supported by Near-RT RIC |
| Excessive functions | RIC has reached a limit on the number of declared RAN functions |
| RIC resource limit | RIC has reached a resource limit |

|  |  |
| --- | --- |
| E2 Node configuration cause | Meaning |
| E2 Node component unknown | The received message refers to an unknown E2 Node component |

|  |  |
| --- | --- |
| Transport Layer cause | Meaning |
| Unspecified | Sent when none of the cause values below applies but still the cause is Transport Network Layer related. |
| Transport Resource Unavailable | The required transport resources are not available. |

|  |  |
| --- | --- |
| **Protocol cause** | **Meaning** |
| Transfer Syntax Error | The received message included a transfer syntax error. |
| Abstract Syntax Error (Reject) | The received message included an abstract syntax error and the concerning criticality indicated "reject". |
| Abstract Syntax Error (Ignore And Notify) | The received message included an abstract syntax error and the concerning criticality indicated "ignore and notify". |
| Message Not Compatible With Receiver State | The received message was not compatible with the receiver state. |
| Semantic Error | The received message included a semantic error. |
| Abstract Syntax Error (Falsely Constructed Message) | The received message contained IEs or IE groups in wrong order or with too many occurrences. |
| Unspecified | Sent when none of the above cause values applies but still the cause is Protocol related. |

| **Miscellaneous cause** | **Meaning** |
| --- | --- |
| Control Processing Overload | Control processing overload. |
| Not EnoughUser Plane Processing Resources Available | Not enough resources are available related to user plane processing. |
| Hardware Failure | Action related to hardware failure. |
| O&M Intervention | The action is due to O&M intervention. |
| Unspecified Failure | Sent when none of the above cause values applies and the cause is not related to any of the categories Radio Network Layer, Transport Network Layer, NAS or Protocol. |

### 9.2.2 Criticality Diagnostics

The *Criticality Diagnostics* IE is sent by the E2 Node or the Near-RT RIC when parts of a received message have not been comprehended or were missing, or if the message contained logical errors. When applicable, it contains information about which IEs were not comprehended or were missing.

For further details on how to use the *Criticality Diagnostics* IE, (see clause 10). The conditions for inclusion of the *Transaction ID* IE are described in clause 10.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| Procedure Code | O |  | INTEGER (0..255) | Procedure Code is to be used if Criticality Diagnostics is part of Error Indication procedure, and not within the response message of the same procedure that caused the error. |
| Triggering Message | O |  | ENUMERATED (initiating message, successful outcome, unsuccessful outcome) | The Triggering Message is used only if the Criticality Diagnostics is part of Error Indication procedure. |
| Procedure Criticality | O |  | ENUMERATED (reject, ignore, notify) | This Procedure Criticality is used for reporting the Criticality of the Triggering message (Procedure). |
| RIC Request ID | O |  | 9.2.7 |  |
| **Information Element Criticality Diagnostics** |  | *0 .. <maxnoof Errors>* |  |  |
| >IE Criticality | M |  | ENUMERATED (reject, ignore, notify) | The IE Criticality is used for reporting the criticality of the triggering IE. The value 'ignore' shall not be used. |
| >IE ID | M |  | INTEGER (0..65535) | The IE ID of the not understood or missing IE. |
| >Type of Error | M |  | ENUMERATED (not understood, missing, ...) |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofErrors | Maximum no. of IE errors allowed to be reported with a single message. The value for maxnoofErrors is 256. |

### 9.2.3 Message Type

The *Message Type* IE uniquely identifies the message being sent. It is mandatory for all messages.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| **Message Type** |  |  |  |  |
| >Procedure Code | M |  | INTEGER (0..255) |  |
| >Type of Message | M |  | CHOICE (Initiating Message, Successful Outcome, Unsuccessful Outcome, ...) |  |

### 9.2.4 Global RIC ID

This IE is used to globally identify an Near-RT RIC.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| PLMN Identity | M |  | 3GPP 38.423 clause 9.2.2.4 |  |
| Near-RT RIC ID | M |  | BIT STRING (SIZE(20)) |  |

### 9.2.5 Time to wait

This IE defines the minimum allowed waiting times.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| Time to wait | M |  | ENUMERATED(1s, 2s, 5s, 10s, 20s, 60s) |  |

### 9.2.6 Global E2 Node ID

This IE is used to globally identify an E2 node.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE | M |  |  |  |
| *>gNB* |  |  |  | To be used when E2 Node supports gNB mode or both gNB and en-gNB modes |
| >>Global gNB ID | M |  | 3GPP 38.423 clause 9.2.2.1 | Required when E2 node supports NR with gNB mode |
| >>Global en-gNB ID | O |  | 3GPP 36.423 clause 9.2.112 | Required when E2 node supports NR with en-gNB mode |
| >>gNB-CU-UP ID | O |  | 3GPP 37.483 clause 9.3.1.15 | Required when E2 Node of type gNB-CU-UP |
| >>gNB-DU ID | O |  | 3GPP 38.473 clause 9.3.1.9 | Required when E2 Node of type gNB-DU |
| >en-gNB |  |  |  | To be used when E2 Node supports en-gNB mode only |
| >>Global en-gNB ID | M |  | 3GPP 36.423 clause 9.2.112 |  |
| >>en-gNB-CU-UP ID | O |  | 3GPP 37.483 clause 9.3.1.15 | Required when E2 Node of type gNB-CU-UP |
| >>en-gNB-DU ID | O |  | 3GPP 38.473 clause 9.3.1.9 | Required when E2 Node of type gNB-DU |
| >*ng-eNB* |  |  |  | To be used when E2 Node supports ng-eNB mode or both ng-eNB and eNB modes |
| >>Global ng-eNB ID | M |  | 3GPP 38.423 clause 9.2.2.2 | Required when E2 Node supports E-UTRA with ng-eNB mode |
| >>Global eNB ID | O |  | 3GPP 36.423 clause 9.2.22 | Required when E2 Node supports E-UTRA with eNB mode |
| >>ng-eNB-DU ID | O |  | 3GPP 37.473 clause 9.3.1.9 | Required when E2 node of type ng-eNB DU |
| >eNB |  |  |  | To be used when E2 Node supports eNB mode only |
| >>Global eNB ID | M |  | 3GPP 36.423 clause 9.2.22 |  |

### 9.2.7 RIC Request ID

This information element indicates the REQUEST ID number.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Requestor ID | M |  | INTEGER (0.. 65535) |  |
| RIC Instance ID | M |  | INTEGER (0..65535) |  |

### 9.2.8 RAN Function ID

This information element indicates the RAN Function ID number, to be unique within a given E2 Node.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RAN Function ID | M |  | INTEGER (0..4095) | Value 0 reserved for Near-RT RIC internal usage |

### 9.2.9 RIC Event Trigger Definition

This information element indicates the RIC event trigger description used by the RIC Subscription procedure.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Event Trigger Definition | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.10 RIC Action ID

This information element indicates the Action ID number, to be unique within the given RIC Request ID.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Action ID | M |  | INTEGER (0..255) |  |

### 9.2.11 RIC Action Type

This IE defines the type of action to be executed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Action Type | M |  | ENUMERATED (Insert, Report, Policy, …) |  |

### 9.2.12 RIC Action Definition

This information element provides parameters to used when executed a **REPORT**, **INSERT** or **POLICY** service.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Action Definition | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.13 RIC Subsequent Action

This IE defines the subsequent action to be taken after completing a particular Action. Shall be present when RIC Action Type set to **Insert**.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Subsequent Action Type | M |  | ENUMERATED (Continue, Halt, …) |  |
| RIC Time to Wait | M |  | ENUMERATED (1ms, 2ms, 5ms, 10ms, 20ms, 30ms, 40ms, 50ms, 100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 20s, 60s, …) |  |

### 9.2.14 RIC Indication Sequence Number (SN)

This information element indicates the Indication Sequence Number (SN).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Indication SN | M |  | INTEGER (0..65535) |  |

### 9.2.15 RIC Indication Type

This IE defines the Indication Type.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Indication Type | M |  | ENUMERATED (Insert, Report, …) |  |

### 9.2.16 RIC Indication message

This information element carries the RIC indication message used for INSERT and REPORT procedures.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Indication message | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.17 RIC Indication header

This information element carries the RIC indication header used for INSERT and REPORT procedures.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Indication header | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.18 RIC Call Process ID

This information element carries the RIC Call Process ID, meaning shall be unique within a given Function on a given E2 Node.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Call Process ID | M |  | OCTET STRING | Defined in RAN Function specific E2 Service model [3] |

### 9.2.19 RIC Control message

This information element carries the RIC control message for the RIC CONTROL procedure.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Control Message | M |  | OCTET STRING | Defined in RAN Function specific E2 Service model [3] |

### 9.2.20 RIC Control header

This information element carries the RIC control header used for CONTROL procedures.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Control header | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.21 RIC Control Ack Request

This IE defines whether and when the RIC CONTROL ACKNOWLEDGE message should be replied as described in the below table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Control Ack Request | M |  | ENUMERATED (NoAck, Ack, …) |  |

The meaning of the different values is described in the following table.

|  |  |
| --- | --- |
| RIC Service cause | Meaning |
| NoAck | Optional RIC Control Acknowledgement is not required |
| Ack | Optional RIC Control Acknowledgement is required |

### 9.2.22 Void

### 9.2.23 RAN Function Definition

This information element carries the RAN Function Definition.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RAN Function Definition | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.24 RAN Function Revision

This information element carries the RAN Function Revision.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RAN Function Revision | M |  | INTEGER (0..4095) |  |

### 9.2.25 RIC Control Outcome

This information element carries the RIC Control Outcome.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Control Outcome | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.26 E2 Node Component Interface Type

This IE is used to identify an E2 node component type.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| E2 node component interface type | M |  | ENUMERATED (ng, xn, e1, f1, w1, s1, x2, …) |  |

### 9.2.27 E2 Node Component Configuration

This IE is used to carry the E2 Node component configuration update information of a specific E2 Node component. In all cases the information is a data structure defined by the appropriate 3GPP specification and carried as an OCTET STRING.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| SEQUENCE | M |  |  |  |
| >E2 Node Component Request Part | M |  | OCTET STRING | Contents depend on component type and used to carry new or updated component configuration. See the table below. |
| >E2 Node Component Response Part | M |  | OCTET STRING | Contents depend on component type and used to carry new or updated component configuration. See the table below. |

The following table presents how this IE should be used for the E2 SETUP REQUEST and E2 NODE CONFIGURATION UPDATE REQUEST messages.

|  | **Component Addition list** | | **Component Update list** | |
| --- | --- | --- | --- | --- |
| **E2 Node component message content** | **Request part** | **Response part** | **Request part** | **Response part** |
| **gNB case** |  |  |  |  |
| >NG  (AMF Name) | NG SETUP REQUEST,  3GPP 38.413 [19] clause 9.2.6.1 | NG SETUP RESPONSE,  3GPP 38.413 [19] clause 9.2.6.2 | RAN CONFIGURATION UPDATE,  3GPP 38.413 [19] clause 9.2.6.4  Or  AMF CONFIGURATION UPDATE,  3GPP 38.413 [19] clause 9.2.6.7 | RAN CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 38.413 [19] clause 9.2.6.5  Or  AMF CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 38.413 [19] clause 9.2.6.8 |
| >Xn  (Neighbour Global NG-RAN Node ID ) | XN SETUP REQUEST, 3GPP 38.423 [20] clause 9.1.3.1 | XN SETUP RESPONSE,  3GPP 38.423 [20] clause 9.1.3.2 | NG-RAN NODE CONFIGURATION UPDATE,  3GPP 38.423 [20] clause 9.1.3.4 | NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 38.423 [20] clause 9.1.3.5 |
| >E1  (gNB-CU-UP ID) | GNB-CU-UP E1 SETUP REQUEST, 3GPP 37.483 [21] clause 9.2.1.4  Or  GNB-CU-CP E1 SETUP REQUEST, 3GPP 37.483 [21] clause 9.2.1.7 | GNB-CU-UP E1 SETUP RESPONSE,  3GPP 37.483 [21] clause 9.2.1.5  Or  GNB-CU-CP E1 SETUP RESPONSE, 3GPP 37.483 [21] clause 9.2.1.8 | GNB-CU-UP CONFIGRATION UPDATE,  3GPP 37.483 [21] clause 9.2.1.10  Or  GNB-CU-CP CONFIGURATION UPDATE, 3GPP 37.483 [21] clause 9.2.1.13 | GNB-CU-UP CONFIGRATION UPDATE ACKNOWLEDGE, 3GPP 37.483 [21] clause 9.2.1.11  Or  GNB-CU-CP CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 37.483 [21] clause 9.2.1.14 |
| >F1  (gNB-DU ID) | F1 SETUP REQUEST, 3GPP 38.473 [22] clause 9.2.1.4 | F1 SETUP RESPONSE, 3GPP 38.473 [22] clause 9.2.1.5 | GNB-DU CONFIGRATION UPDATE, 3GPP 38.473 [22] clause 9.2.1.7  Or  GNB-CU CONFIGURATION UPDATE, 3GPP 38.473 [22] clause 9.2.1.10 | GNB-DU CONFIGRATION UPDATE ACKNOWLEDGE, 3GPP 38.473 [22] clause 9.2.1.8  Or  GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 38.473 [22] clause 9.2.1.11 |
| >X2  (Neighbour Global eNB ID) | EN-DC X2 SETUP REQUEST, 3GPP 36.423 [25] clause 9.1.2.31 | EN-DC X2 SETUP RESPONSE, 3GPP 36.423 [25] clause 9.1.2.32 | EN-DC CONFIGURATION UPDATE, 3GPP 36.423 [25] clause 9.1.2.34 | EN-DC CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 36.423 [25] clause 9.1.2.35 |
| **eNB case** |  |  |  |  |
| >NG  (AMF Name) | NG SETUP REQUEST, 3GPP 38.413 [19] clause 9.2.6.1 | NG SETUP RESPONSE, 3GPP 38.413 [19] clause 9.2.6.2 | RAN CONFIGURATION UPDATE, 3GPP 38.413 [19] clause 9.2.6.4  Or  AMF CONFIGURATION UPDATE, 3GPP 38.413 [19] clause 9.2.6.7 | RAN CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 38.413 [19] clause 9.2.6.5  Or  AMF CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 38.413 [19] clause 9.2.6.8 |
| >Xn  (Neighbour Global NG-RAN Node ID) | XN SETUP REQUEST, 3GPP 38.423 [20] clause 9.1.3.1 | XN SETUP RESPONSE, 3GPP 38.423 [20] clause 9.1.3.2 | NG-RAN NODE CONFIGURATION UPDATE, 3GPP 38.423 [20] clause 9.1.3.4 | NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 38.423 [20] clause 9.1.3.5 |
| >W1  (ng-eNB-DU ID) | W1 SETUP REQUEST, 3GPP 37.473 [23] clause 9.2.1.4 | W1 SETUP RESPONSE, 3GPP 37.473 [23] clause 9.2.1.5 | NG-ENB-DU CONFIGURATION UPDATE, 3GPP 37.473 [23] clause 9.2.1.7  Or  NG-ENB-CU CONFIGURATION UPDATE, 3GPP 37.473 [23] clause 9.2.1.10 | NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 37.473 [23] clause 9.2.1.8  Or  NG-ENB-CU CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 37.473 [23] clause 9.2.1.11 |
| >S1  (MME Name) | S1 SETUP REQUEST, 3GPP 36.413 [24] clause 9.1.8.4 | S1 SETUP RESPONSE, 3GPP 36.413 [24] clause 9.1.8.5 | ENB CONFIGURATION UPDATE,  3GPP 36.413 [24] clause 9.1.8.7  Or  MME CONFIGURATION UPDATE, 3GPP 36.413 [24] clause 9.1.8.10 | ENB CONFIGRATION UPDATE ACKNOWLEDGE, 3GPP 36.413 [24] clause 9.1.8.8  Or  MME CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 36.413 [24] clause 9.1.8.11 |
| >X2 (when neighbour is eNB)  (Neighbour Global eNB ID) | X2 SETUP REQUEST, 3GPP 36.423 [25] clause 9.1.2.3 | X2 SETUP RESPONSE, 3GPP 36.423 [25] clause 9.1.2.4 | ENB CONFIGURATION UPDATE, 3GPP 36.423 [25] clause 9.1.2.8 | ENB CONFIGRATION UPDATE ACKNOWLEDGE, 3GPP 36.423 [25] clause 9.1.2.9 |
| >X2  (when neighbour is en-gNB)  (Neighbour Global eNB ID) | EN-DC X2 SETUP REQUEST, 3GPP 36.423 [25] clause 9.1.2.31 | EN-DC X2 SETUP RESPONSE, 3GPP 36.423 [25] clause 9.1.2.32 | EN-DC CONFIGURATION UPDATE, 3GPP 36.423 [25] clause 9.1.2.34 | EN-DC CONFIGURATION UPDATE ACKNOWLEDGE, 3GPP 36.423 [25] clause 9.1.2.35 |

### 9.2.28 E2 Node Component Configuration Acknowledge

This IE is used to carry the E2 Node component configuration update acknowledge of a specific E2 Node component.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Outcome | M |  | ENUMERATED (success, failure,…) |  |
| Cause | O |  | 9.2.1 | Cause for failure |

### 9.2.29 Transport Layer Information

This information element provides Near-RT RIC address and optionally port number to be used by an E2 Node.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| Transport Layer Address | M |  | BIT STRING (SIZE(1..160,…)) | To be passed to transport layer without interpretation |
| Transport Layer Port | O |  | BIT STRING (SIZE(16)) | To be passed to transport layer without interpretation |

### 9.2.30 TNL Association Usage

This information element provides TNL association usage.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| TNL Association Usage | M |  | ENUMERATED (ric service, support functions, both,..) | Indicates whether E2 connection to be used for RIC services only, or E2 support functions only, or both |

### 9.2.31 RAN Function OID

This information element carries the RAN Function OID

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RAN Function Service Model OID | M |  | PrintableString(SIZE(1..1000,...)) | Object Identifier of the specific RAN Function definition. Formatted as per OID (e.g. 1.3.6.1.4.1.53148.1.2.1 for E2SM-NI) |

### 9.2.32 E2 Node Component ID

This IE is used to locally identify an E2 node component.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *E2 node component interface type* | M |  |  |  |
| >NG |  |  |  |  |
| >>AMF name | M |  | 3GPP 38.413 [19] clause 9.3.3.21 | Serving AMF |
| >Xn |  |  |  |  |
| >>Global NG-RAN Node ID | M |  | 3GPP 38.423 [20] clause 9.2.2.3 | Neighbour gNB or ng-eNB |
| >E1 |  |  |  |  |
| >>gNB-CU-UP ID | M |  | 3GPP 37.483 [21] clause 9.3.1.15 |  |
| >F1 |  |  |  |  |
| >>gNB-DU ID | M |  | 3GPP 38.473 [22] clause 9.3.1.9 |  |
| >W1 |  |  |  |  |
| >>ng-eNB-DU ID | M |  | 3GPP 37.473 [23] clause |  |
| >S1 |  |  |  |  |
| >>MME name | M |  | 3GPP 36.413 [24], clause 9.1.8.5 | Serving MME |
| >X2 |  |  |  |  |
| >>Global eNB ID | O |  | 3GPP 36.423 [25] clause 9.2.22 | Neighbour eNB |
| >>Global en-gNB ID | O |  | 3GPP 36.423 [25] clause 9.2.112 | Neighbour en-gNB |

### 9.2.33 Transaction ID

The *Transaction ID* IE uniquely identifies a procedure among all ongoing parallel procedures of the same type initiated by the same protocol peer. Messages belonging to the same procedure shall use the same Transaction ID. The Transaction ID is determined by the initiating peer of a procedure.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Transaction ID | M |  | INTEGER (0..255, …) |  |

### 9.2.34 RIC Subscription Time

The *RIC Subscription Time* IE is used to set the start and end time of a RIC Subscription.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| RIC Subscription time | M |  | OCTET STRING (SIZE(8)) | Encoded using the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [26]. |

### 9.2.35 RIC Action Execution Order IE

This IE is used to modify the default RIC service action execution order.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Action Execution Order | M |  | INTEGER (0..255, ...) | 0 used to indicate “Any-order”  1..255 Used to enforce a specific execution order |

### 9.2.36 RIC Query Header

This information element carries the RIC Query Header used by the RIC Query Request procedure.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Query Header | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.37 RIC Query Definition

This information element carries the RIC Query Definition used by the RIC Query Request procedure.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Query Definition | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

### 9.2.38 RIC Query Outcome

This information element carries the RIC Query Outcome used by the RIC Query Response procedure.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| RIC Query Outcome | M |  | OCTET STRING | Defined in RAN Function specific E2 Service Model [3] |

## 9.3 Message and Information Element Abstract Syntax (with ASN.1)

### 9.3.1 General

E2AP ASN.1 definition conforms to ITU-T Rec. X.691 [15], ITU-T Rec. X.680 [16] and ITU-T Rec. X.681 [17].

The ASN.1 definition specifies the structure and content of E2AP messages. E2AP messages can contain any IEs specified in the object set definitions for that message without the order or number of occurrence being restricted by ASN.1. However, for this version of the standard, a sending entity shall construct an E2AP message according to the PDU definitions module and with the following additional rules:

- IEs shall be ordered (in an IE container) in the order they appear in object set definitions.

- Object set definitions specify how many times IEs may appear. An IE shall appear exactly once if the presence field in an object has value "mandatory". An IE may appear at most once if the presence field in an object has value "optional" or "conditional". If in a tabular format there is multiplicity specified for an IE (i.e., an IE list) then in the corresponding ASN.1 definition the list definition is separated into two parts. The first part defines an IE container list where the list elements reside. The second part defines list elements. The IE container list appears as an IE of its own. For this version of the standard an IE container list may contain only one kind of list elements.

NOTE: In the above "IE" means an IE in the object set with an explicit ID. If one IE needs to appear more than once in one object set, then the different occurrences will have different IE IDs.

If an E2AP message that is not constructed as defined above is received, this shall be considered as Abstract Syntax Error, and the message shall be handled as defined for Abstract Syntax Error in subclause 10.3.6.

### 9.3.2 Usage of private message mechanism for non-standard use

The private message mechanism for non-standard are not supported with E2AP.

### 9.3.3 Elementary Procedure Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Elementary Procedure definitions

-- Derived from 3GPP 38.413 v15.4.0 NGAP

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-PDU-Descriptions {

iso(1) identified-organization(3) dod(6) internet(1) private(4) enterprise(1) 53148 e2(1) version2 (2) e2ap(1) e2ap-PDU-Descriptions (0) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IE parameter types from other modules.

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

IMPORTS

Criticality,

ProcedureCode

FROM E2AP-CommonDataTypes

E2connectionUpdate,

E2connectionUpdateAcknowledge,

E2connectionUpdateFailure,

E2nodeConfigurationUpdate,

E2nodeConfigurationUpdateAcknowledge,

E2nodeConfigurationUpdateFailure,

E2RemovalRequest,

E2RemovalResponse,

E2RemovalFailure,

E2setupFailure,

E2setupRequest,

E2setupResponse,

ErrorIndication,

ResetRequest,

ResetResponse,

RICcontrolAcknowledge,

RICcontrolFailure,

RICcontrolRequest,

RICindication,

RICserviceQuery,

RICserviceUpdate,

RICserviceUpdateAcknowledge,

RICserviceUpdateFailure,

RICsubscriptionFailure,

RICsubscriptionRequest,

RICsubscriptionResponse,

RICsubscriptionDeleteFailure,

RICsubscriptionDeleteRequest,

RICsubscriptionDeleteResponse,

RICsubscriptionDeleteRequired,

RICsubscriptionModificationRequest,

RICsubscriptionModificationResponse,

RICsubscriptionModificationFailure,

RICsubscriptionModificationRequired,

RICsubscriptionModificationConfirm,

RICsubscriptionModificationRefuse,

RICqueryRequest,

RICqueryResponse,

RICqueryFailure

FROM E2AP-PDU-Contents

id-E2connectionUpdate,

id-E2nodeConfigurationUpdate,

id-E2removal,

id-E2setup,

id-ErrorIndication,

id-Reset,

id-RICcontrol,

id-RICindication,

id-RICserviceQuery,

id-RICserviceUpdate,

id-RICsubscription,

id-RICsubscriptionDelete,

id-RICsubscriptionDeleteRequired,

id-RICsubscriptionModification,

id-RICsubscriptionModificationRequired,

id-RICquery

FROM E2AP-Constants;

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Interface Elementary Procedure Class

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-ELEMENTARY-PROCEDURE ::= CLASS {

&InitiatingMessage ,

&SuccessfulOutcome OPTIONAL ,

&UnsuccessfulOutcome OPTIONAL ,

&procedureCode ProcedureCode UNIQUE ,

&criticality Criticality DEFAULT ignore

}

WITH SYNTAX {

INITIATING MESSAGE &InitiatingMessage

[SUCCESSFUL OUTCOME &SuccessfulOutcome]

[UNSUCCESSFUL OUTCOME &UnsuccessfulOutcome]

PROCEDURE CODE &procedureCode

[CRITICALITY &criticality]

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Interface PDU Definition

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-PDU ::= CHOICE {

initiatingMessage InitiatingMessage,

successfulOutcome SuccessfulOutcome,

unsuccessfulOutcome UnsuccessfulOutcome,

...

}

InitiatingMessage ::= SEQUENCE {

procedureCode E2AP-ELEMENTARY-PROCEDURE.&procedureCode ({E2AP-ELEMENTARY-PROCEDURES}),

criticality E2AP-ELEMENTARY-PROCEDURE.&criticality ({E2AP-ELEMENTARY-PROCEDURES}{@procedureCode}),

value E2AP-ELEMENTARY-PROCEDURE.&InitiatingMessage ({E2AP-ELEMENTARY-PROCEDURES}{@procedureCode})

}

SuccessfulOutcome ::= SEQUENCE {

procedureCode E2AP-ELEMENTARY-PROCEDURE.&procedureCode ({E2AP-ELEMENTARY-PROCEDURES}),

criticality E2AP-ELEMENTARY-PROCEDURE.&criticality ({E2AP-ELEMENTARY-PROCEDURES}{@procedureCode}),

value E2AP-ELEMENTARY-PROCEDURE.&SuccessfulOutcome ({E2AP-ELEMENTARY-PROCEDURES}{@procedureCode})

}

UnsuccessfulOutcome ::= SEQUENCE {

procedureCode E2AP-ELEMENTARY-PROCEDURE.&procedureCode ({E2AP-ELEMENTARY-PROCEDURES}),

criticality E2AP-ELEMENTARY-PROCEDURE.&criticality ({E2AP-ELEMENTARY-PROCEDURES}{@procedureCode}),

value E2AP-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome ({E2AP-ELEMENTARY-PROCEDURES}{@procedureCode})

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Interface Elementary Procedure List

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-ELEMENTARY-PROCEDURES E2AP-ELEMENTARY-PROCEDURE ::= {

E2AP-ELEMENTARY-PROCEDURES-CLASS-1 |

E2AP-ELEMENTARY-PROCEDURES-CLASS-2,

...

}

E2AP-ELEMENTARY-PROCEDURES-CLASS-1 E2AP-ELEMENTARY-PROCEDURE ::= {

ricSubscription |

ricSubscriptionDelete |

ricSubscriptionModification |

ricSubscriptionModificationRequired |

ricQuery |

ricServiceUpdate |

ricControl |

e2setup |

e2nodeConfigurationUpdate |

e2connectionUpdate |

reset |

e2removal,

...

}

E2AP-ELEMENTARY-PROCEDURES-CLASS-2 E2AP-ELEMENTARY-PROCEDURE ::= {

ricIndication |

ricServiceQuery |

errorIndication |

ricSubscriptionDeleteRequired,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Interface Elementary Procedures

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- New for v01.01

e2connectionUpdate E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE E2connectionUpdate

SUCCESSFUL OUTCOME E2connectionUpdateAcknowledge

UNSUCCESSFUL OUTCOME E2connectionUpdateFailure

PROCEDURE CODE id-E2connectionUpdate

CRITICALITY reject

}

e2nodeConfigurationUpdate E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE E2nodeConfigurationUpdate

SUCCESSFUL OUTCOME E2nodeConfigurationUpdateAcknowledge

UNSUCCESSFUL OUTCOME E2nodeConfigurationUpdateFailure

PROCEDURE CODE id-E2nodeConfigurationUpdate

CRITICALITY reject

}

-- New for v02.01

e2removal E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE E2RemovalRequest

SUCCESSFUL OUTCOME E2RemovalResponse

UNSUCCESSFUL OUTCOME E2RemovalFailure

PROCEDURE CODE id-E2removal

CRITICALITY reject

}

e2setup E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE E2setupRequest

SUCCESSFUL OUTCOME E2setupResponse

UNSUCCESSFUL OUTCOME E2setupFailure

PROCEDURE CODE id-E2setup

CRITICALITY reject

}

errorIndication E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ErrorIndication

PROCEDURE CODE id-ErrorIndication

CRITICALITY ignore

}

reset E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ResetRequest

SUCCESSFUL OUTCOME ResetResponse

PROCEDURE CODE id-Reset

CRITICALITY reject

}

ricControl E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICcontrolRequest

SUCCESSFUL OUTCOME RICcontrolAcknowledge

UNSUCCESSFUL OUTCOME RICcontrolFailure

PROCEDURE CODE id-RICcontrol

CRITICALITY reject

}

ricIndication E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICindication

PROCEDURE CODE id-RICindication

CRITICALITY ignore

}

ricServiceQuery E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICserviceQuery

PROCEDURE CODE id-RICserviceQuery

CRITICALITY ignore

}

ricServiceUpdate E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICserviceUpdate

SUCCESSFUL OUTCOME RICserviceUpdateAcknowledge

UNSUCCESSFUL OUTCOME RICserviceUpdateFailure

PROCEDURE CODE id-RICserviceUpdate

CRITICALITY reject

}

ricSubscription E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICsubscriptionRequest

SUCCESSFUL OUTCOME RICsubscriptionResponse

UNSUCCESSFUL OUTCOME RICsubscriptionFailure

PROCEDURE CODE id-RICsubscription

CRITICALITY reject

}

ricSubscriptionDelete E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICsubscriptionDeleteRequest

SUCCESSFUL OUTCOME RICsubscriptionDeleteResponse

UNSUCCESSFUL OUTCOME RICsubscriptionDeleteFailure

PROCEDURE CODE id-RICsubscriptionDelete

CRITICALITY reject

}

ricSubscriptionDeleteRequired E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICsubscriptionDeleteRequired

PROCEDURE CODE id-RICsubscriptionDeleteRequired

CRITICALITY ignore

}

ricSubscriptionModification E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICsubscriptionModificationRequest

SUCCESSFUL OUTCOME RICsubscriptionModificationResponse

UNSUCCESSFUL OUTCOME RICsubscriptionModificationFailure

PROCEDURE CODE id-RICsubscriptionModification

CRITICALITY reject

}

ricSubscriptionModificationRequired E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICsubscriptionModificationRequired

SUCCESSFUL OUTCOME RICsubscriptionModificationConfirm

UNSUCCESSFUL OUTCOME RICsubscriptionModificationRefuse

PROCEDURE CODE id-RICsubscriptionModificationRequired

CRITICALITY reject

}

ricQuery E2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE RICQueryRequest

SUCCESSFUL OUTCOME RICQueryResponse

UNSUCCESSFUL OUTCOME RICQueryFailure

PROCEDURE CODE id-RICquery

CRITICALITY reject

}

END

-- ASN1STOP

### 9.3.4 PDU definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- PDU definitions for E2AP

-- Derived from 3GPP 38.413 (NGAP)

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-PDU-Contents {

iso(1) identified-organization(3) dod(6) internet(1) private(4) enterprise(1) 53148 e2(1) version2 (2) e2ap(1) e2ap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IE parameter types from other modules.

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

IMPORTS

Cause,

CriticalityDiagnostics,

E2nodeComponentConfiguration,

E2nodeComponentConfigurationAck,

E2nodeComponentID,

E2nodeComponentInterfaceType,

GlobalE2node-ID,

GlobalRIC-ID,

RANfunctionDefinition,

RANfunctionID,

RANfunctionOID,

RANfunctionRevision,

RICactionDefinition,

RICactionExecutionOrder,

RICactionID,

RICactionType,

RICcallProcessID,

RICcontrolAckRequest,

RICcontrolHeader,

RICcontrolMessage,

RICcontrolOutcome,

RICeventTriggerDefinition,

RICindicationHeader,

RICindicationMessage,

RICindicationSN,

RICindicationType,

RICrequestID,

RICsubsequentAction,

RICsubscriptionTime,

RICqueryHeader,

RICqueryDefinition,

RICqueryOutcome,

TimeToWait,

TNLinformation,

TNLusage,

TransactionID

FROM E2AP-IEs

ProtocolIE-Container{},

ProtocolIE-ContainerList{},

ProtocolIE-SingleContainer{},

E2AP-PROTOCOL-IES,

E2AP-PROTOCOL-IES-PAIR

FROM E2AP-Containers

id-Cause,

id-CriticalityDiagnostics,

id-E2connectionSetup,

id-E2connectionSetupFailed,

id-E2connectionSetupFailed-Item,

id-E2connectionFailed-Item,

id-E2connectionUpdate-Item,

id-E2connectionUpdateAdd,

id-E2connectionUpdateModify,

id-E2connectionUpdateRemove,

id-E2connectionUpdateRemove-Item,

id-E2nodeComponentConfigAddition,

id-E2nodeComponentConfigAddition-Item,

id-E2nodeComponentConfigAdditionAck,

id-E2nodeComponentConfigAdditionAck-Item,

id-E2nodeComponentConfigRemoval,

id-E2nodeComponentConfigRemoval-Item,

id-E2nodeComponentConfigRemovalAck,

id-E2nodeComponentConfigRemovalAck-Item,

id-E2nodeComponentConfigUpdate,

id-E2nodeComponentConfigUpdate-Item,

id-E2nodeComponentConfigUpdateAck,

id-E2nodeComponentConfigUpdateAck-Item,

id-E2nodeTNLassociationRemoval,

id-E2nodeTNLassociationRemoval-Item,

id-GlobalE2node-ID,

id-GlobalRIC-ID,

id-RANfunctionID,

id-RANfunctionID-Item,

id-RANfunctionIEcause-Item,

id-RANfunction-Item,

id-RANfunctionsAccepted,

id-RANfunctionsAdded,

id-RANfunctionsDeleted,

id-RANfunctionsModified,

id-RANfunctionsRejected,

id-RICaction-Admitted-Item,

id-RICactionID,

id-RICaction-NotAdmitted-Item,

id-RICactions-Admitted,

id-RICactions-NotAdmitted,

id-RICaction-ToBeSetup-Item,

id-RICactionsToBeRemovedForModification-List,

id-RICaction-ToBeRemovedForModification-Item,

id-RICactionsToBeModifiedForModification-List,

id-RICaction-ToBeModifiedForModification-Item,

id-RICactionsToBeAddedForModification-List,

id-RICaction-ToBeAddedForModification-Item,

id-RICactionsRemovedForModification-List,

id-RICaction-RemovedForModification-Item,

id-RICactionsFailedToBeRemovedForModification-List,

id-RICaction-FailedToBeRemovedForModification-Item,

id-RICactionsModifiedForModification-List,

id-RICaction-ModifiedForModification-Item,

id-RICactionsFailedToBeModifiedForModification-List,

id-RICaction-FailedToBeModifiedForModification-Item,

id-RICactionsAddedForModification-List,

id-RICaction-AddedForModification-Item,

id-RICactionsFailedToBeAddedForModification-List,

id-RICaction-FailedToBeAddedForModification-Item,

id-RICactionsRequiredToBeModified-List,

id-RICaction-RequiredToBeModified-Item,

id-RICactionsRequiredToBeRemoved-List,

id-RICaction-RequiredToBeRemoved-Item,

id-RICactionsConfirmedForModification-List,

id-RICaction-ConfirmedForModification-Item,

id-RICactionsRefusedToBeModified-List,

id-RICaction-RefusedToBeModified-Item,

id-RICactionsConfirmedForRemoval-List,

id-RICaction-ConfirmedForRemoval-Item,

id-RICactionsRefusedToBeRemoved-List,

id-RICaction-RefusedToBeRemoved-Item,

id-RICcallProcessID,

id-RICcontrolAckRequest,

id-RICcontrolHeader,

id-RICcontrolMessage,

id-RICcontrolOutcome,

id-RICeventTriggerDefinitionToBeModified,

id-RICindicationHeader,

id-RICindicationMessage,

id-RICindicationSN,

id-RICindicationType,

id-RICrequestID,

id-RICserviceQuery,

id-RICsubscriptionDetails,

id-RICsubscriptionToBeRemoved,

id-RICsubscription-withCause-Item,

id-RICsubscriptionStartTime,

id-RICsubscriptionEndTime,

id-RICqueryHeader,

id-RICqueryDefinition,

id-RICqueryOutcome,

id-TimeToWait,

id-TNLinformation,

id-TransactionID,

maxofE2nodeComponents,

maxofRANfunctionID,

maxofRICactionID,

maxofRICrequestID,

maxofTNLA

FROM E2AP-Constants;

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- MESSAGES FOR NEAR-RT RIC FUNCTIONAL PROCEDURES

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC Subscription Elementary Procedure

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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--

-- RIC SUBSCRIPTION REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionRequest-IEs}},

...

}

RICsubscriptionRequest-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory}|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory}|

{ ID id-RICsubscriptionDetails CRITICALITY reject TYPE RICsubscriptionDetails PRESENCE mandatory},

...,

{ ID id-RICsubscriptionStartTime CRITICALITY reject TYPE RICsubscriptionTime PRESENCE optional}|

{ ID id-RICsubscriptionEndTime CRITICALITY reject TYPE RICsubscriptionTime PRESENCE optional}

}

RICsubscriptionDetails ::= SEQUENCE {

ricEventTriggerDefinition RICeventTriggerDefinition,

ricAction-ToBeSetup-List RICactions-ToBeSetup-List,

...

}

RICactions-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxofRICactionID)) OF ProtocolIE-SingleContainer { {RICaction-ToBeSetup-ItemIEs} }

RICaction-ToBeSetup-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-ToBeSetup-Item CRITICALITY ignore TYPE RICaction-ToBeSetup-Item PRESENCE mandatory },

...

}

RICaction-ToBeSetup-Item ::= SEQUENCE {

ricActionID RICactionID,

ricActionType RICactionType,

ricActionDefinition RICactionDefinition OPTIONAL,

ricSubsequentAction RICsubsequentAction OPTIONAL,

...,

ricActionExecutionOrder RICactionExecutionOrder OPTIONAL -- New in E2APv03.00

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC SUBSCRIPTION RESPONSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container{{RICsubscriptionResponse-IEs}},

...

}

RICsubscriptionResponse-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory } |

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory } |

{ ID id-RICactions-Admitted CRITICALITY reject TYPE RICaction-Admitted-List PRESENCE mandatory } |

{ ID id-RICactions-NotAdmitted CRITICALITY reject TYPE RICaction-NotAdmitted-List PRESENCE optional },

...

}

RICaction-Admitted-List ::= SEQUENCE (SIZE(1..maxofRICactionID)) OF ProtocolIE-SingleContainer{{RICaction-Admitted-ItemIEs}}

RICaction-Admitted-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-Admitted-Item CRITICALITY ignore TYPE RICaction-Admitted-Item PRESENCE mandatory },

...

}

RICaction-Admitted-Item ::= SEQUENCE {

ricActionID RICactionID,

...

}

RICaction-NotAdmitted-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer { {RICaction-NotAdmitted-ItemIEs} }

RICaction-NotAdmitted-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-NotAdmitted-Item CRITICALITY ignore TYPE RICaction-NotAdmitted-Item PRESENCE mandatory },

...

}

RICaction-NotAdmitted-Item ::= SEQUENCE {

ricActionID RICactionID,

cause Cause,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC SUBSCRIPTION FAILURE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionFailure-IEs}},

...

}

RICsubscriptionFailure-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY reject TYPE Cause PRESENCE mandatory }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC Subscription Delete Elementary Procedure

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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--

-- RIC SUBSCRIPTION DELETE REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionDeleteRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionDeleteRequest-IEs}},

...

}

RICsubscriptionDeleteRequest-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC SUBSCRIPTION DELETE RESPONSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionDeleteResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionDeleteResponse-IEs}},

...

}

RICsubscriptionDeleteResponse-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC SUBSCRIPTION DELETE FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionDeleteFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionDeleteFailure-IEs}},

...

}

RICsubscriptionDeleteFailure-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC Subscription Delete Required Elementary Procedure

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RIC SUBSCRIPTION DELETE REQUIRED

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionDeleteRequired ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionDeleteRequired-IEs}},

...

}

RICsubscriptionDeleteRequired-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICsubscriptionToBeRemoved CRITICALITY ignore TYPE RICsubscription-List-withCause PRESENCE mandatory },

...

}

RICsubscription-List-withCause ::= SEQUENCE (SIZE(1..maxofRICrequestID)) OF ProtocolIE-SingleContainer { {RICsubscription-withCause-ItemIEs} }

RICsubscription-withCause-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICsubscription-withCause-Item CRITICALITY ignore TYPE RICsubscription-withCause-Item PRESENCE mandatory },

...

}

RICsubscription-withCause-Item ::= SEQUENCE {

ricRequestID RICrequestID,

ranFunctionID RANfunctionID,

cause Cause,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RIC Subscription Modification Elementary Procedure

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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--

-- RIC SUBSCRIPTION MODIFICATION REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionModificationRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionModificationRequest-IEs}},

...

}

RICsubscriptionModificationRequest-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory}|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory}|

{ ID id-RICeventTriggerDefinitionToBeModified CRITICALITY ignore TYPE RICeventTriggerDefinition PRESENCE optional}|

{ ID id-RICactionsToBeRemovedForModification-List CRITICALITY ignore TYPE RICactions-ToBeRemovedForModification-List PRESENCE optional}|

{ ID id-RICactionsToBeModifiedForModification-List CRITICALITY ignore TYPE RICactions-ToBeModifiedForModification-List PRESENCE optional}|

{ ID id-RICactionsToBeAddedForModification-List CRITICALITY ignore TYPE RICactions-ToBeAddedForModification-List PRESENCE optional},

...

}

RICactions-ToBeRemovedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-ToBeRemovedForModification-ItemIEs} }

RICaction-ToBeRemovedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-ToBeRemovedForModification-Item CRITICALITY ignore TYPE RICaction-ToBeRemovedForModification-Item PRESENCE mandatory },

...

}

RICaction-ToBeRemovedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

...

}

RICactions-ToBeModifiedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-ToBeModifiedForModification-ItemIEs} }

RICaction-ToBeModifiedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-ToBeModifiedForModification-Item CRITICALITY ignore TYPE RICaction-ToBeModifiedForModification-Item PRESENCE mandatory },

...

}

RICaction-ToBeModifiedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

ricActionDefinition RICactionDefinition OPTIONAL,

ricActionExecutionOrder RICactionExecutionOrder OPTIONAL,

ricSubsequentAction RICsubsequentAction OPTIONAL,

...

}

RICactions-ToBeAddedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-ToBeAddedForModification-ItemIEs} }

RICaction-ToBeAddedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-ToBeAddedForModification-Item CRITICALITY ignore TYPE RICaction-ToBeAddedForModification-Item PRESENCE mandatory },

...

}

RICaction-ToBeAddedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

ricActionType RICactionType,

ricActionDefinition RICactionDefinition,

ricActionExecutionOrder RICactionExecutionOrder,

ricSubsequentAction RICsubsequentAction OPTIONAL,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RIC SUBSCRIPTION MODIFICATION RESPONSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionModificationResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionModificationResponse-IEs}},

...

}

RICsubscriptionModificationResponse-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory}|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory}|

{ ID id-RICactionsRemovedForModification-List CRITICALITY ignore TYPE RICactions-RemovedForModification-List PRESENCE optional}|

{ ID id-RICactionsFailedToBeRemovedForModification-List CRITICALITY ignore TYPE RICactions-FailedToBeRemovedForModification-List PRESENCE optional}|

{ ID id-RICactionsModifiedForModification-List CRITICALITY ignore TYPE RICactions-ModifiedForModification-List PRESENCE optional}|

{ ID id-RICactionsFailedToBeModifiedForModification-List CRITICALITY ignore TYPE RICactions-FailedToBeModifiedForModification-List PRESENCE optional}|

{ ID id-RICactionsAddedForModification-List CRITICALITY ignore TYPE RICactions-AddedForModification-List PRESENCE optional}|

{ ID id-RICactionsFailedToBeAddedForModification-List CRITICALITY ignore TYPE RICactions-FailedToBeAddedForModification-List PRESENCE optional},

...

}

RICactions-RemovedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-RemovedForModification-ItemIEs} }

RICaction-RemovedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-RemovedForModification-Item CRITICALITY ignore TYPE RICaction-RemovedForModification-Item PRESENCE mandatory },

...

}

RICaction-RemovedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

...

}

RICactions-FailedToBeRemovedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-FailedToBeRemovedForModification-ItemIEs} }

RICaction-FailedToBeRemovedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-FailedToBeRemovedForModification-Item CRITICALITY ignore TYPE RICaction-FailedToBeRemovedForModification-Item PRESENCE mandatory },

...

}

RICaction-FailedToBeRemovedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

cause Cause,

...

}

RICactions-ModifiedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-ModifiedForModification-ItemIEs} }

RICaction-ModifiedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-ModifiedForModification-Item CRITICALITY ignore TYPE RICaction-ModifiedForModification-Item PRESENCE mandatory },

...

}

RICaction-ModifiedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

...

}

RICactions-FailedToBeModifiedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-FailedToBeModifiedForModification-ItemIEs} }

RICaction-FailedToBeModifiedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-FailedToBeModifiedForModification-Item CRITICALITY ignore TYPE RICaction-FailedToBeModifiedForModification-Item PRESENCE mandatory },

...

}

RICaction-FailedToBeModifiedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

cause Cause,

...

}

RICactions-AddedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-AddedForModification-ItemIEs} }

RICaction-AddedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-AddedForModification-Item CRITICALITY ignore TYPE RICaction-AddedForModification-Item PRESENCE mandatory },

...

}

RICaction-AddedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

...

}

RICactions-FailedToBeAddedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-FailedToBeAddedForModification-ItemIEs} }

RICaction-FailedToBeAddedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-FailedToBeAddedForModification-Item CRITICALITY ignore TYPE RICaction-FailedToBeAddedForModification-Item PRESENCE mandatory },

...

}

RICaction-FailedToBeAddedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

cause Cause,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RIC SUBSCRIPTION MODIFICATION FAILURE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionModificationFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionModificationFailure-IEs}},

...

}

RICsubscriptionModificationFailure-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory}|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory}|

{ ID id-Cause CRITICALITY reject TYPE Cause PRESENCE mandatory}|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RIC Subscription Modification Required Elementary Procedure

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RIC SUBSCRIPTION MODIFICATION REQUIRED

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionModificationRequired ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionModificationRequired-IEs}},

...

}

RICsubscriptionModificationRequired-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory}|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory}|

{ ID id-RICactionsRequiredToBeModified-List CRITICALITY ignore TYPE RICactions-RequiredToBeModified-List PRESENCE optional}|

{ ID id-RICactionsRequiredToBeRemoved-List CRITICALITY ignore TYPE RICactions-RequiredToBeRemoved-List PRESENCE optional},

...

}

RICactions-RequiredToBeModified-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-RequiredToBeModified-ItemIEs} }

RICaction-RequiredToBeModified-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-RequiredToBeModified-Item CRITICALITY ignore TYPE RICaction-RequiredToBeModified-Item PRESENCE mandatory },

...

}

RICaction-RequiredToBeModified-Item ::= SEQUENCE {

ricActionID RICactionID,

ricTimeToWait RICtimeToWait,

...

}

RICactions-RequiredToBeRemoved-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-RequiredToBeRemoved-ItemIEs} }

RICaction-RequiredToBeRemoved-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-RequiredToBeRemoved-Item CRITICALITY ignore TYPE RICaction-RequiredToBeRemoved-Item PRESENCE mandatory },

...

}

RICaction-RequiredToBeRemoved-Item ::= SEQUENCE {

ricActionID RICactionID,

cause Cause,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RIC SUBSCRIPTION MODIFICATION CONFIRM

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionModificationConfirm ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionModificationConfirm-IEs}},

...

}

RICsubscriptionModificationConfirm-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory}|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory}|

{ ID id-RICactionsConfirmedForModification-List CRITICALITY ignore TYPE RICactions-ConfirmedForModification-List PRESENCE optional}|

{ ID id-RICactionsRefusedToBeModified-List CRITICALITY ignore TYPE RICactions-RefusedToBeModified-List PRESENCE optional}|

{ ID id-RICactionsConfirmedForRemoval-List CRITICALITY ignore TYPE RICactions-ConfirmedForRemoval-List PRESENCE optional}|

{ ID id-RICactionsRefusedToBeRemoved-List CRITICALITY ignore TYPE RICactions-RefusedToBeRemoved-List PRESENCE optional},

...

}

RICactions-ConfirmedForModification-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-ConfirmedForModification-ItemIEs} }

RICaction-ConfirmedForModification-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-ConfirmedForModification-Item CRITICALITY ignore TYPE RICaction-ConfirmedForModification-Item PRESENCE mandatory },

...

}

RICaction-ConfirmedForModification-Item ::= SEQUENCE {

ricActionID RICactionID,

...

}

RICactions-RefusedToBeModified-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-RefusedToBeModified-ItemIEs} }

RICaction-RefusedToBeModified-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-RefusedToBeModified-Item CRITICALITY ignore TYPE RICaction-RefusedToBeModified-Item PRESENCE mandatory },

...

}

RICaction-RefusedToBeModified-Item ::= SEQUENCE {

ricActionID RICactionID,

cause Cause,

...

}

RICactions-ConfirmedForRemoval-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-ConfirmedForRemoval-ItemIEs} }

RICaction-ConfirmedForRemoval-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-ConfirmedForRemoval-Item CRITICALITY ignore TYPE RICaction-ConfirmedForRemoval-Item PRESENCE mandatory },

...

}

RICaction-ConfirmedForRemoval-Item ::= SEQUENCE {

ricActionID RICactionID,

...

}

RICactions-RefusedToBeRemoved-List ::= SEQUENCE (SIZE(0..maxofRICactionID)) OF ProtocolIE-SingleContainer {{RICaction-RefusedToBeRemoved-ItemIEs} }

RICaction-RefusedToBeRemoved-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICaction-RefusedToBeRemoved-Item CRITICALITY ignore TYPE RICaction-RefusedToBeRemoved-Item PRESENCE mandatory },

...

}

RICaction-RefusedToBeRemoved-Item ::= SEQUENCE {

ricActionID RICactionID,

cause Cause,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RIC SUBSCRIPTION MODIFICATION REFUSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICsubscriptionModificationRefuse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICsubscriptionModificationRefuse-IEs}},

...

}

RICsubscriptionModificationRefuse-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory}|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory}|

{ ID id-Cause CRITICALITY reject TYPE Cause PRESENCE mandatory}|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC Indication Elementary Procedure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC INDICATION

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICindication ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICindication-IEs}},

...

}

RICindication-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-RICactionID CRITICALITY reject TYPE RICactionID PRESENCE mandatory }|

{ ID id-RICindicationSN CRITICALITY reject TYPE RICindicationSN PRESENCE optional }|

{ ID id-RICindicationType CRITICALITY reject TYPE RICindicationType PRESENCE mandatory }|

{ ID id-RICindicationHeader CRITICALITY reject TYPE RICindicationHeader PRESENCE mandatory }|

{ ID id-RICindicationMessage CRITICALITY reject TYPE RICindicationMessage PRESENCE mandatory }|

{ ID id-RICcallProcessID CRITICALITY reject TYPE RICcallProcessID PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC Control Elementary Procedure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC CONTROL REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICcontrolRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICcontrolRequest-IEs}},

...

}

RICcontrolRequest-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-RICcallProcessID CRITICALITY reject TYPE RICcallProcessID PRESENCE optional }|

{ ID id-RICcontrolHeader CRITICALITY reject TYPE RICcontrolHeader PRESENCE mandatory }|

{ ID id-RICcontrolMessage CRITICALITY reject TYPE RICcontrolMessage PRESENCE mandatory }|

{ ID id-RICcontrolAckRequest CRITICALITY reject TYPE RICcontrolAckRequest PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC CONTROL ACKNOWLEDGE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICcontrolAcknowledge ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICcontrolAcknowledge-IEs}},

...

}

RICcontrolAcknowledge-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-RICcallProcessID CRITICALITY reject TYPE RICcallProcessID PRESENCE optional }|

{ ID id-RICcontrolOutcome CRITICALITY reject TYPE RICcontrolOutcome PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC CONTROL FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICcontrolFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICcontrolFailure-IEs}},

...

}

RICcontrolFailure-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-RICcallProcessID CRITICALITY reject TYPE RICcallProcessID PRESENCE optional }|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

{ ID id-RICcontrolOutcome CRITICALITY reject TYPE RICcontrolOutcome PRESENCE optional },

...,

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC QUERY Elementary Procedure

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC QUERY REQUEST

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICQueryRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICQueryRequest-IEs}},

...

}

RICQueryRequest-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-RICqueryHeader CRITICALITY reject TYPE RICqueryHeader PRESENCE mandatory }|

{ ID id-RICqueryDefinition CRITICALITY reject TYPE RICqueryDefinition PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC QUERY RESPONSE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICQueryResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICQueryResponse-IEs}},

...

}

RICQueryResponse-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-RICqueryOutcome CRITICALITY reject TYPE RICqueryOutcome PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC QUERY FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICQueryFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICQueryFailure-IEs}},

...

}

RICQueryFailure-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE mandatory }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- MESSAGES FOR GLOBAL PROCEDURES

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Error Indication Elementary Procedure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- ERROR INDICATION

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ErrorIndication ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ErrorIndication-IEs}},

...

}

ErrorIndication-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE optional }|

{ ID id-RICrequestID CRITICALITY reject TYPE RICrequestID PRESENCE optional }|

{ ID id-RANfunctionID CRITICALITY reject TYPE RANfunctionID PRESENCE optional }|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE optional }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 Setup Elementary Procedure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 SETUP REQUEST

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2setupRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {E2setupRequestIEs} },

...

}

E2setupRequestIEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-GlobalE2node-ID CRITICALITY reject TYPE GlobalE2node-ID PRESENCE mandatory }|

{ ID id-RANfunctionsAdded CRITICALITY reject TYPE RANfunctions-List PRESENCE mandatory }|

{ ID id-E2nodeComponentConfigAddition CRITICALITY reject TYPE E2nodeComponentConfigAddition-List PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 SETUP RESPONSE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2setupResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {E2setupResponseIEs} },

...

}

E2setupResponseIEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-GlobalRIC-ID CRITICALITY reject TYPE GlobalRIC-ID PRESENCE mandatory }|

{ ID id-RANfunctionsAccepted CRITICALITY reject TYPE RANfunctionsID-List PRESENCE optional }|

{ ID id-RANfunctionsRejected CRITICALITY reject TYPE RANfunctionsIDcause-List PRESENCE optional }|

{ ID id-E2nodeComponentConfigAdditionAck CRITICALITY reject TYPE E2nodeComponentConfigAdditionAck-List PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 SETUP FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2setupFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {E2setupFailureIEs} },

...

}

E2setupFailureIEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

{ ID id-TimeToWait CRITICALITY ignore TYPE TimeToWait PRESENCE optional }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }|

{ ID id-TNLinformation CRITICALITY ignore TYPE TNLinformation PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 Connection Update Elementary Procedure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 CONNECTION UPDATE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2connectionUpdate ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E2connectionUpdate-IEs}},

...

}

E2connectionUpdate-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-E2connectionUpdateAdd CRITICALITY reject TYPE E2connectionUpdate-List PRESENCE optional }|

{ ID id-E2connectionUpdateRemove CRITICALITY reject TYPE E2connectionUpdateRemove-List PRESENCE optional }|

{ ID id-E2connectionUpdateModify CRITICALITY reject TYPE E2connectionUpdate-List PRESENCE optional },

...

}

E2connectionUpdate-List ::= SEQUENCE (SIZE(1..maxofTNLA)) OF ProtocolIE-SingleContainer { {E2connectionUpdate-ItemIEs} }

E2connectionUpdate-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2connectionUpdate-Item CRITICALITY ignore TYPE E2connectionUpdate-Item PRESENCE mandatory },

...

}

E2connectionUpdate-Item ::= SEQUENCE {

tnlInformation TNLinformation,

tnlUsage TNLusage,

...

}

E2connectionUpdateRemove-List ::= SEQUENCE (SIZE(1..maxofTNLA)) OF ProtocolIE-SingleContainer { {E2connectionUpdateRemove-ItemIEs} }

E2connectionUpdateRemove-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2connectionUpdateRemove-Item CRITICALITY ignore TYPE E2connectionUpdateRemove-Item PRESENCE mandatory },

...

}

E2connectionUpdateRemove-Item ::= SEQUENCE {

tnlInformation TNLinformation,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 CONNECTION UPDATE ACKNOWLEDGE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2connectionUpdateAcknowledge ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E2connectionUpdateAck-IEs}},

...

}

E2connectionUpdateAck-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-E2connectionSetup CRITICALITY reject TYPE E2connectionUpdate-List PRESENCE optional }|

{ ID id-E2connectionSetupFailed CRITICALITY reject TYPE E2connectionSetupFailed-List PRESENCE optional },

...

}

E2connectionSetupFailed-List ::= SEQUENCE (SIZE(1..maxofTNLA)) OF ProtocolIE-SingleContainer { {E2connectionSetupFailed-ItemIEs} }

E2connectionSetupFailed-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2connectionSetupFailed-Item CRITICALITY ignore TYPE E2connectionSetupFailed-Item PRESENCE mandatory },

...

}

E2connectionSetupFailed-Item ::= SEQUENCE {

tnlInformation TNLinformation,

cause Cause,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 CONNECTION UPDATE FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2connectionUpdateFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E2connectionUpdateFailure-IEs}},

...

}

E2connectionUpdateFailure-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY reject TYPE Cause PRESENCE optional }|

{ ID id-TimeToWait CRITICALITY ignore TYPE TimeToWait PRESENCE optional }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 Node Configuration Update Elementary Procedure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 NODE CONFIGURATION UPDATE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2nodeConfigurationUpdate ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E2nodeConfigurationUpdate-IEs}},

...

}

E2nodeConfigurationUpdate-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-GlobalE2node-ID CRITICALITY reject TYPE GlobalE2node-ID PRESENCE optional }|

{ ID id-E2nodeComponentConfigAddition CRITICALITY reject TYPE E2nodeComponentConfigAddition-List PRESENCE optional }|

{ ID id-E2nodeComponentConfigUpdate CRITICALITY reject TYPE E2nodeComponentConfigUpdate-List PRESENCE optional }|

{ ID id-E2nodeComponentConfigRemoval CRITICALITY reject TYPE E2nodeComponentConfigRemoval-List PRESENCE optional }|

{ ID id-E2nodeTNLassociationRemoval CRITICALITY reject TYPE E2nodeTNLassociationRemoval-List PRESENCE optional },

...

}

E2nodeComponentConfigAddition-List ::= SEQUENCE (SIZE(1..maxofE2nodeComponents)) OF ProtocolIE-SingleContainer { {E2nodeComponentConfigAddition-ItemIEs} }

E2nodeComponentConfigAddition-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2nodeComponentConfigAddition-Item CRITICALITY reject TYPE E2nodeComponentConfigAddition-Item PRESENCE mandatory },

...

}

E2nodeComponentConfigAddition-Item ::= SEQUENCE {

e2nodeComponentInterfaceType E2nodeComponentInterfaceType,

e2nodeComponentID E2nodeComponentID,

e2nodeComponentConfiguration E2nodeComponentConfiguration,

...

}

E2nodeComponentConfigUpdate-List ::= SEQUENCE (SIZE(1..maxofE2nodeComponents)) OF ProtocolIE-SingleContainer { {E2nodeComponentConfigUpdate-ItemIEs} }

E2nodeComponentConfigUpdate-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2nodeComponentConfigUpdate-Item CRITICALITY reject TYPE E2nodeComponentConfigUpdate-Item PRESENCE mandatory },

...

}

E2nodeComponentConfigUpdate-Item ::= SEQUENCE {

e2nodeComponentInterfaceType E2nodeComponentInterfaceType,

e2nodeComponentID E2nodeComponentID,

e2nodeComponentConfiguration E2nodeComponentConfiguration,

...

}

E2nodeComponentConfigRemoval-List ::= SEQUENCE (SIZE(1..maxofE2nodeComponents)) OF ProtocolIE-SingleContainer { {E2nodeComponentConfigRemoval-ItemIEs} }

E2nodeComponentConfigRemoval-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2nodeComponentConfigRemoval-Item CRITICALITY reject TYPE E2nodeComponentConfigRemoval-Item PRESENCE mandatory },

...

}

E2nodeComponentConfigRemoval-Item ::= SEQUENCE {

e2nodeComponentInterfaceType E2nodeComponentInterfaceType,

e2nodeComponentID E2nodeComponentID,

...

}

E2nodeTNLassociationRemoval-List ::= SEQUENCE (SIZE(1..maxofTNLA)) OF ProtocolIE-SingleContainer { {E2nodeTNLassociationRemoval-ItemIEs} }

E2nodeTNLassociationRemoval-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2nodeTNLassociationRemoval-Item CRITICALITY reject TYPE E2nodeTNLassociationRemoval-Item PRESENCE mandatory },

...

}

E2nodeTNLassociationRemoval-Item ::= SEQUENCE {

tnlInformation TNLinformation,

tnlInformationRIC TNLinformation,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 NODE CONFIGURATION UPDATE ACKNOWLEDGE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2nodeConfigurationUpdateAcknowledge ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E2nodeConfigurationUpdateAcknowledge-IEs}},

...

}

E2nodeConfigurationUpdateAcknowledge-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-E2nodeComponentConfigAdditionAck CRITICALITY reject TYPE E2nodeComponentConfigAdditionAck-List PRESENCE optional }|

{ ID id-E2nodeComponentConfigUpdateAck CRITICALITY reject TYPE E2nodeComponentConfigUpdateAck-List PRESENCE optional }|

{ ID id-E2nodeComponentConfigRemovalAck CRITICALITY reject TYPE E2nodeComponentConfigRemovalAck-List PRESENCE optional },

...

}

E2nodeComponentConfigAdditionAck-List ::= SEQUENCE (SIZE(1..maxofE2nodeComponents)) OF ProtocolIE-SingleContainer { {E2nodeComponentConfigAdditionAck-ItemIEs} }

E2nodeComponentConfigAdditionAck-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2nodeComponentConfigAdditionAck-Item CRITICALITY reject TYPE E2nodeComponentConfigAdditionAck-Item PRESENCE mandatory },

...

}

E2nodeComponentConfigAdditionAck-Item ::= SEQUENCE {

e2nodeComponentInterfaceType E2nodeComponentInterfaceType,

e2nodeComponentID E2nodeComponentID,

e2nodeComponentConfigurationAck E2nodeComponentConfigurationAck,

...

}

E2nodeComponentConfigUpdateAck-List ::= SEQUENCE (SIZE(1..maxofE2nodeComponents)) OF ProtocolIE-SingleContainer { {E2nodeComponentConfigUpdateAck-ItemIEs} }

E2nodeComponentConfigUpdateAck-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2nodeComponentConfigUpdateAck-Item CRITICALITY reject TYPE E2nodeComponentConfigUpdateAck-Item PRESENCE mandatory },

...

}

E2nodeComponentConfigUpdateAck-Item ::= SEQUENCE {

e2nodeComponentInterfaceType E2nodeComponentInterfaceType,

e2nodeComponentID E2nodeComponentID,

e2nodeComponentConfigurationAck E2nodeComponentConfigurationAck,

...

}

E2nodeComponentConfigRemovalAck-List ::= SEQUENCE (SIZE(1..maxofE2nodeComponents)) OF ProtocolIE-SingleContainer { {E2nodeComponentConfigRemovalAck-ItemIEs} }

E2nodeComponentConfigRemovalAck-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-E2nodeComponentConfigRemovalAck-Item CRITICALITY reject TYPE E2nodeComponentConfigRemovalAck-Item PRESENCE mandatory },

...

}

E2nodeComponentConfigRemovalAck-Item ::= SEQUENCE {

e2nodeComponentInterfaceType E2nodeComponentInterfaceType,

e2nodeComponentID E2nodeComponentID,

e2nodeComponentConfigurationAck E2nodeComponentConfigurationAck,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 NODE CONFIGURATION UPDATE FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2nodeConfigurationUpdateFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E2nodeConfigurationUpdateFailure-IEs}},

...

}

E2nodeConfigurationUpdateFailure-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

{ ID id-TimeToWait CRITICALITY ignore TYPE TimeToWait PRESENCE optional }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Reset Elementary Procedure

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RESET REQUEST

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ResetRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {ResetRequestIEs} },

...

}

ResetRequestIEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RESET RESPONSE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ResetResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {ResetResponseIEs} },

...

}

ResetResponseIEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC Service Update Elementary Procedure

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC SERVICE UPDATE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICserviceUpdate ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICserviceUpdate-IEs}},

...

}

RICserviceUpdate-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-RANfunctionsAdded CRITICALITY reject TYPE RANfunctions-List PRESENCE optional }|

{ ID id-RANfunctionsModified CRITICALITY reject TYPE RANfunctions-List PRESENCE optional }|

{ ID id-RANfunctionsDeleted CRITICALITY reject TYPE RANfunctionsID-List PRESENCE optional },

...

}

RANfunctions-List ::= SEQUENCE (SIZE(1..maxofRANfunctionID)) OF ProtocolIE-SingleContainer { {RANfunction-ItemIEs} }

RANfunction-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RANfunction-Item CRITICALITY ignore TYPE RANfunction-Item PRESENCE mandatory },

...

}

RANfunction-Item ::= SEQUENCE {

ranFunctionID RANfunctionID,

ranFunctionDefinition RANfunctionDefinition,

ranFunctionRevision RANfunctionRevision,

ranFunctionOID RANfunctionOID,

...

}

RANfunctionsID-List ::= SEQUENCE (SIZE(1..maxofRANfunctionID)) OF ProtocolIE-SingleContainer{{RANfunctionID-ItemIEs}}

RANfunctionID-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RANfunctionID-Item CRITICALITY ignore TYPE RANfunctionID-Item PRESENCE mandatory },

...

}

RANfunctionID-Item ::= SEQUENCE {

ranFunctionID RANfunctionID,

ranFunctionRevision RANfunctionRevision,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC SERVICE UPDATE ACKNOWLEDGE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICserviceUpdateAcknowledge ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICserviceUpdateAcknowledge-IEs}},

...

}

RICserviceUpdateAcknowledge-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-RANfunctionsAccepted CRITICALITY reject TYPE RANfunctionsID-List PRESENCE optional }|

{ ID id-RANfunctionsRejected CRITICALITY reject TYPE RANfunctionsIDcause-List PRESENCE optional },

...

}

RANfunctionsIDcause-List ::= SEQUENCE (SIZE(1..maxofRANfunctionID)) OF ProtocolIE-SingleContainer { {RANfunctionIDcause-ItemIEs} }

RANfunctionIDcause-ItemIEs E2AP-PROTOCOL-IES ::= {

{ ID id-RANfunctionIEcause-Item CRITICALITY ignore TYPE RANfunctionIDcause-Item PRESENCE mandatory },

...

}

RANfunctionIDcause-Item ::= SEQUENCE {

ranFunctionID RANfunctionID,

cause Cause,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC SERVICE UPDATE FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICserviceUpdateFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICserviceUpdateFailure-IEs}},

...

}

RICserviceUpdateFailure-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY reject TYPE Cause PRESENCE mandatory }|

{ ID id-TimeToWait CRITICALITY ignore TYPE TimeToWait PRESENCE optional }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC Service Query Elementary Procedure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RIC SERVICE QUERY

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICserviceQuery ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{RICserviceQuery-IEs}},

...

}

RICserviceQuery-IEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-RANfunctionsAccepted CRITICALITY reject TYPE RANfunctionsID-List PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 Removal Elementary Procedure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 REMOVAL REQUEST

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2RemovalRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {E2RemovalRequestIEs} },

...

}

E2RemovalRequestIEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 REMOVAL RESPONSE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2RemovalResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {E2RemovalResponseIEs} },

...

}

E2RemovalResponseIEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- E2 REMOVAL FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2RemovalFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {E2RemovalFailureIEs} },

...

}

E2RemovalFailureIEs E2AP-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

END

-- ASN1STOP

### 9.3.5 Information Element Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- E2AP

-- Information Element Definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-IEs {

iso(1) identified-organization(3) dod(6) internet(1) private(4) enterprise(1) 53148 e2(1) version2 (2) e2ap(1) e2ap-IEs (2)}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

Criticality,

Presence,

ProcedureCode,

ProtocolIE-ID,

TriggeringMessage

FROM E2AP-CommonDataTypes

maxnoofErrors,

maxProtocolIEs

FROM E2AP-Constants;

-- A

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- [New for E2AP v02.00] copied from 3GPP 38.413 (NGAP) IEs

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

AMFName ::= PrintableString (SIZE(1..150, ...))

-- B

-- C

Cause ::= CHOICE {

ricRequest CauseRICrequest,

ricService CauseRICservice,

e2Node CauseE2node,

transport CauseTransport,

protocol CauseProtocol,

misc CauseMisc,

...

}

CauseE2node ::= ENUMERATED {

e2node-component-unknown,

...

}

CauseMisc ::= ENUMERATED {

control-processing-overload,

hardware-failure,

om-intervention,

unspecified,

...

}

CauseProtocol ::= ENUMERATED {

transfer-syntax-error,

abstract-syntax-error-reject,

abstract-syntax-error-ignore-and-notify,

message-not-compatible-with-receiver-state,

semantic-error,

abstract-syntax-error-falsely-constructed-message,

unspecified,

...

}

CauseRICrequest ::= ENUMERATED {

ran-function-id-invalid,

action-not-supported,

excessive-actions,

duplicate-action,

duplicate-event-trigger,

function-resource-limit,

request-id-unknown,

inconsistent-action-subsequent-action-sequence,

control-message-invalid,

ric-call-process-id-invalid,

control-timer-expired,

control-failed-to-execute,

system-not-ready,

unspecified,

... ,

ric-subscription-end-time-expired,

ric-subscription-end-time-invalid,

duplicate-ric-request-id,

eventTriggerNotSupported,

requested-information-unavailable,

invalid-information-request

}

CauseRICservice ::= ENUMERATED{

ran-function-not-supported,

excessive-functions,

ric-resource-limit,

...

}

CauseTransport ::= ENUMERATED {

unspecified,

transport-resource-unavailable,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 38.413 (NGAP) IEs

-- note: ie-Extensions removed

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

CriticalityDiagnostics ::= SEQUENCE {

procedureCode ProcedureCode OPTIONAL,

triggeringMessage TriggeringMessage OPTIONAL,

procedureCriticality Criticality OPTIONAL,

ricRequestorID RICrequestID OPTIONAL,

iEsCriticalityDiagnostics CriticalityDiagnostics-IE-List OPTIONAL,

...

}

CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE(1..maxnoofErrors)) OF CriticalityDiagnostics-IE-Item

CriticalityDiagnostics-IE-Item ::= SEQUENCE {

iECriticality Criticality,

iE-ID ProtocolIE-ID,

typeOfError TypeOfError,

...

}

-- D

-- E

-- Following IE used to carry 3GPP defined SETUP and RAN Configuration messages defined in F1AP, E1AP, XnAP, etc.

E2nodeComponentConfiguration ::= SEQUENCE{

e2nodeComponentRequestPart OCTET STRING,

e2nodeComponentResponsePart OCTET STRING,

...

}

E2nodeComponentConfigurationAck ::= SEQUENCE{

updateOutcome ENUMERATED {success, failure, ...},

failureCause Cause OPTIONAL,

...

}

E2nodeComponentInterfaceType ::= ENUMERATED {ng, xn, e1, f1, w1, s1, x2,...}

E2nodeComponentID ::= CHOICE{

e2nodeComponentInterfaceTypeNG E2nodeComponentInterfaceNG,

e2nodeComponentInterfaceTypeXn E2nodeComponentInterfaceXn,

e2nodeComponentInterfaceTypeE1 E2nodeComponentInterfaceE1,

e2nodeComponentInterfaceTypeF1 E2nodeComponentInterfaceF1,

e2nodeComponentInterfaceTypeW1 E2nodeComponentInterfaceW1,

e2nodeComponentInterfaceTypeS1 E2nodeComponentInterfaceS1,

e2nodeComponentInterfaceTypeX2 E2nodeComponentInterfaceX2,

...

}

E2nodeComponentInterfaceE1 ::= SEQUENCE{

gNB-CU-UP-ID GNB-CU-UP-ID,

...

}

E2nodeComponentInterfaceF1 ::= SEQUENCE{

gNB-DU-ID GNB-DU-ID,

...

}

E2nodeComponentInterfaceNG ::= SEQUENCE{

amf-name AMFName,

...

}

E2nodeComponentInterfaceS1 ::= SEQUENCE{

mme-name MMEname,

...

}

E2nodeComponentInterfaceX2 ::= SEQUENCE{

global-eNB-ID GlobalENB-ID OPTIONAL,

global-en-gNB-ID GlobalenGNB-ID OPTIONAL,

...

}

E2nodeComponentInterfaceXn ::= SEQUENCE{

global-NG-RAN-Node-ID GlobalNG-RANNode-ID,

...

}

E2nodeComponentInterfaceW1 ::= SEQUENCE{

ng-eNB-DU-ID NGENB-DU-ID,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 36.423 (X2AP) IEs

-- note: ie-Extensions removed

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENB-ID ::= CHOICE {

macro-eNB-ID BIT STRING (SIZE (20)),

home-eNB-ID BIT STRING (SIZE (28)),

... ,

short-Macro-eNB-ID BIT STRING (SIZE(18)),

long-Macro-eNB-ID BIT STRING (SIZE(21))

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 38.423 (XnAP) IEs

-- note: choice-extension removed

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENB-ID-Choice ::= CHOICE {

enb-ID-macro BIT STRING (SIZE(20)),

enb-ID-shortmacro BIT STRING (SIZE(18)),

enb-ID-longmacro BIT STRING (SIZE(21)),

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 36.423 (X2AP) IEs

-- note: ie-Extensions removed

-- Note: to avoid duplicate names with XnAP, GNB-ID renamed ENGNB-ID, GlobalGNB-ID renamed GlobalenGNB-ID

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENGNB-ID ::= CHOICE {

gNB-ID BIT STRING (SIZE (22..32)),

...

}

-- F

-- G

GlobalE2node-ID ::= CHOICE{

gNB GlobalE2node-gNB-ID,

en-gNB GlobalE2node-en-gNB-ID,

ng-eNB GlobalE2node-ng-eNB-ID,

eNB GlobalE2node-eNB-ID,

...

}

GlobalE2node-en-gNB-ID ::= SEQUENCE{

global-en-gNB-ID GlobalenGNB-ID,

en-gNB-CU-UP-ID GNB-CU-UP-ID OPTIONAL,

en-gNB-DU-ID GNB-DU-ID OPTIONAL,

...

}

GlobalE2node-eNB-ID ::= SEQUENCE{

global-eNB-ID GlobalENB-ID,

...

}

GlobalE2node-gNB-ID ::= SEQUENCE{

global-gNB-ID GlobalgNB-ID,

global-en-gNB-ID GlobalenGNB-ID OPTIONAL,

gNB-CU-UP-ID GNB-CU-UP-ID OPTIONAL,

gNB-DU-ID GNB-DU-ID OPTIONAL,

...

}

GlobalE2node-ng-eNB-ID ::= SEQUENCE{

global-ng-eNB-ID GlobalngeNB-ID,

global-eNB-ID GlobalENB-ID OPTIONAL,

ngENB-DU-ID NGENB-DU-ID OPTIONAL,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 36.423 (X2AP) IEs

-- note: ie-Extensions removed

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GlobalENB-ID ::= SEQUENCE {

pLMN-Identity PLMN-Identity,

eNB-ID ENB-ID,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 36.423 (X2AP) IEs

-- Note: to avoid duplicate names with XnAP, GNB-ID renamed ENGNB-ID, GlobalGNB-ID renamed GlobalenGNB-ID

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GlobalenGNB-ID ::= SEQUENCE {

pLMN-Identity PLMN-Identity,

gNB-ID ENGNB-ID,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 38.423 (XnAP) IEs

-- note: choice-extension removed

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GlobalgNB-ID ::= SEQUENCE {

plmn-id PLMN-Identity,

gnb-id GNB-ID-Choice,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 38.423 (XnAP) IEs

-- note: choice-extension removed

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GlobalngeNB-ID ::= SEQUENCE {

plmn-id PLMN-Identity,

enb-id ENB-ID-Choice,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- [NEW for E2AP v02.00] copied from 3GPP 38.423 (XnAP) IEs

-- Note: extension field removed

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GlobalNG-RANNode-ID ::= CHOICE {

gNB GlobalgNB-ID,

ng-eNB GlobalngeNB-ID,

...

}

GlobalRIC-ID ::= SEQUENCE{

pLMN-Identity PLMN-Identity,

ric-ID BIT STRING (SIZE (20)),

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 37.483 (E1AP) IEs

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GNB-CU-UP-ID::= INTEGER (0..68719476735)

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 38.473 (F1AP) IEs

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GNB-DU-ID::= INTEGER (0..68719476735)

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 38.423 (XnAP) IEs

-- note: choice-extension removed

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GNB-ID-Choice ::= CHOICE {

gnb-ID BIT STRING (SIZE(22..32)),

...

}

-- H

-- I

-- J

-- K

-- L

-- M

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- [New for E2AP v02.00] copied from 3GPP 36.413 (S1AP) IEs

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

MMEname ::= PrintableString (SIZE (1..150,...))

-- N

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 37.473 (W1AP) IEs

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

NGENB-DU-ID ::= INTEGER (0..68719476735)

-- O

-- P

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 36.423 (X2AP) IEs

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PLMN-Identity ::= OCTET STRING (SIZE(3))

-- Q

-- R

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RANfunctionDefinition ::= OCTET STRING

RANfunctionID ::= INTEGER (0..4095)

RANfunctionOID ::= PrintableString(SIZE(1..1000,...))

RANfunctionRevision ::= INTEGER (0..4095)

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICactionDefinition ::= OCTET STRING

-- new in E2AP-v03.00

RICactionExecutionOrder ::= INTEGER (0..255, ...)

RICactionID ::= INTEGER (0..255)

RICactionType ::= ENUMERATED{

report,

insert,

policy,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICcallProcessID ::= OCTET STRING

RICcontrolAckRequest ::= ENUMERATED{

noAck,

ack,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICcontrolHeader ::= OCTET STRING

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICcontrolMessage ::= OCTET STRING

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICcontrolOutcome ::= OCTET STRING

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICeventTriggerDefinition ::= OCTET STRING

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICindicationHeader ::= OCTET STRING

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICindicationMessage ::= OCTET STRING

RICindicationSN ::= INTEGER (0..65535)

RICindicationType ::= ENUMERATED{

report,

insert,

...

}

RICrequestID ::= SEQUENCE {

ricRequestorID INTEGER (0..65535),

ricInstanceID INTEGER (0..65535),

...

}

RICsubscriptionTime ::= OCTET STRING (SIZE(8))

RICsubsequentAction ::=SEQUENCE{

ricSubsequentActionType RICsubsequentActionType,

ricTimeToWait RICtimeToWait,

...

}

RICsubsequentActionType ::= ENUMERATED{

continue,

wait,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICqueryHeader ::= OCTET STRING

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICqueryDefinition ::= OCTET STRING

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Following IE defined in E2SM

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RICqueryOutcome ::= OCTET STRING

RICtimeToWait ::= ENUMERATED{

w1ms,

w2ms,

w5ms,

w10ms,

w20ms,

w30ms,

w40ms,

w50ms,

w100ms,

w200ms,

w500ms,

w1s,

w2s,

w5s,

w10s,

w20s,

w60s,

...

}

-- S

-- T

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 38.413 (NGAP) IEs

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

TimeToWait ::= ENUMERATED {v1s, v2s, v5s, v10s, v20s, v60s, ...}

TNLinformation ::= SEQUENCE{

tnlAddress BIT STRING (SIZE(1..160,...)),

tnlPort BIT STRING (SIZE(16)) OPTIONAL,

...

}

TNLusage ::= ENUMERATED{ric-service, support-function, both, ...}

TransactionID ::= INTEGER (0..255,...)

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- copied from 3GPP 38.413 (NGAP) IEs

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

TypeOfError ::= ENUMERATED {

not-understood,

missing,

...

}

-- U

-- V

-- W

-- X

-- Y

-- Z

END

-- ASN1STOP

### 9.3.6 Common definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Common definitions

-- Derived from 3GPP 38.413 (NGAP)

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-CommonDataTypes {

iso(1) identified-organization(3) dod(6) internet(1) private(4) enterprise(1) 53148 e2(1) version2 (2) e2ap(1) e2ap-CommonDataTypes (3) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

Criticality ::= ENUMERATED { reject, ignore, notify }

Presence ::= ENUMERATED { optional, conditional, mandatory }

ProcedureCode ::= INTEGER (0..255)

ProtocolIE-ID ::= INTEGER (0..65535)

TriggeringMessage ::= ENUMERATED { initiating-message, successful-outcome, unsuccessfull-outcome }

END

-- ASN1STOP

### 9.3.7 Constant definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Constant definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-Constants {

iso(1) identified-organization(3) dod(6) internet(1) private(4) enterprise(1) 53148 e2(1) version2 (2) e2ap(1) e2ap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

ProcedureCode,

ProtocolIE-ID

FROM E2AP-CommonDataTypes;

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Elementary Procedures

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

id-E2setup ProcedureCode ::= 1

id-ErrorIndication ProcedureCode ::= 2

id-Reset ProcedureCode ::= 3

id-RICcontrol ProcedureCode ::= 4

id-RICindication ProcedureCode ::= 5

id-RICserviceQuery ProcedureCode ::= 6

id-RICserviceUpdate ProcedureCode ::= 7

id-RICsubscription ProcedureCode ::= 8

id-RICsubscriptionDelete ProcedureCode ::= 9

id-E2nodeConfigurationUpdate ProcedureCode ::= 10

id-E2connectionUpdate ProcedureCode ::= 11

id-RICsubscriptionDeleteRequired ProcedureCode ::= 12

id-E2removal ProcedureCode ::= 13

id-RICsubscriptionModification ProcedureCode ::= 14

id-RICsubscriptionModificationRequired ProcedureCode ::= 15

id-RICquery ProcedureCode ::= 16

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Extension constants

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

maxProtocolIEs INTEGER ::= 65535

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Lists

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

maxnoofErrors INTEGER ::= 256

maxofE2nodeComponents INTEGER ::= 1024

maxofRANfunctionID INTEGER ::= 256

maxofRICactionID INTEGER ::= 16

maxofTNLA INTEGER ::= 32

maxofRICrequestID INTEGER ::= 1024

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IEs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

id-Cause ProtocolIE-ID ::= 1

id-CriticalityDiagnostics ProtocolIE-ID ::= 2

id-GlobalE2node-ID ProtocolIE-ID ::= 3

id-GlobalRIC-ID ProtocolIE-ID ::= 4

id-RANfunctionID ProtocolIE-ID ::= 5

id-RANfunctionID-Item ProtocolIE-ID ::= 6

id-RANfunctionIEcause-Item ProtocolIE-ID ::= 7

id-RANfunction-Item ProtocolIE-ID ::= 8

id-RANfunctionsAccepted ProtocolIE-ID ::= 9

id-RANfunctionsAdded ProtocolIE-ID ::= 10

id-RANfunctionsDeleted ProtocolIE-ID ::= 11

id-RANfunctionsModified ProtocolIE-ID ::= 12

id-RANfunctionsRejected ProtocolIE-ID ::= 13

id-RICaction-Admitted-Item ProtocolIE-ID ::= 14

id-RICactionID ProtocolIE-ID ::= 15

id-RICaction-NotAdmitted-Item ProtocolIE-ID ::= 16

id-RICactions-Admitted ProtocolIE-ID ::= 17

id-RICactions-NotAdmitted ProtocolIE-ID ::= 18

id-RICaction-ToBeSetup-Item ProtocolIE-ID ::= 19

id-RICcallProcessID ProtocolIE-ID ::= 20

id-RICcontrolAckRequest ProtocolIE-ID ::= 21

id-RICcontrolHeader ProtocolIE-ID ::= 22

id-RICcontrolMessage ProtocolIE-ID ::= 23

id-RICcontrolStatus ProtocolIE-ID ::= 24

id-RICindicationHeader ProtocolIE-ID ::= 25

id-RICindicationMessage ProtocolIE-ID ::= 26

id-RICindicationSN ProtocolIE-ID ::= 27

id-RICindicationType ProtocolIE-ID ::= 28

id-RICrequestID ProtocolIE-ID ::= 29

id-RICsubscriptionDetails ProtocolIE-ID ::= 30

id-TimeToWait ProtocolIE-ID ::= 31

id-RICcontrolOutcome ProtocolIE-ID ::= 32

id-E2nodeComponentConfigUpdate ProtocolIE-ID ::= 33

id-E2nodeComponentConfigUpdate-Item ProtocolIE-ID ::= 34

id-E2nodeComponentConfigUpdateAck ProtocolIE-ID ::= 35

id-E2nodeComponentConfigUpdateAck-Item ProtocolIE-ID ::= 36

id-E2connectionSetup ProtocolIE-ID ::= 39

id-E2connectionSetupFailed ProtocolIE-ID ::= 40

id-E2connectionSetupFailed-Item ProtocolIE-ID ::= 41

id-E2connectionFailed-Item ProtocolIE-ID ::= 42

id-E2connectionUpdate-Item ProtocolIE-ID ::= 43

id-E2connectionUpdateAdd ProtocolIE-ID ::= 44

id-E2connectionUpdateModify ProtocolIE-ID ::= 45

id-E2connectionUpdateRemove ProtocolIE-ID ::= 46

id-E2connectionUpdateRemove-Item ProtocolIE-ID ::= 47

id-TNLinformation ProtocolIE-ID ::= 48

id-TransactionID ProtocolIE-ID ::= 49

id-E2nodeComponentConfigAddition ProtocolIE-ID ::= 50

id-E2nodeComponentConfigAddition-Item ProtocolIE-ID ::= 51

id-E2nodeComponentConfigAdditionAck ProtocolIE-ID ::= 52

id-E2nodeComponentConfigAdditionAck-Item ProtocolIE-ID ::= 53

id-E2nodeComponentConfigRemoval ProtocolIE-ID ::= 54

id-E2nodeComponentConfigRemoval-Item ProtocolIE-ID ::= 55

id-E2nodeComponentConfigRemovalAck ProtocolIE-ID ::= 56

id-E2nodeComponentConfigRemovalAck-Item ProtocolIE-ID ::= 57

id-E2nodeTNLassociationRemoval ProtocolIE-ID ::= 58

id-E2nodeTNLassociationRemoval-Item ProtocolIE-ID ::= 59

id-RICsubscriptionToBeRemoved ProtocolIE-ID ::= 60

id-RICsubscription-withCause-Item ProtocolIE-ID ::= 61

id-RICsubscriptionStartTime ProtocolIE-ID ::= 62

id-RICsubscriptionEndTime ProtocolIE-ID ::= 63

id-RICeventTriggerDefinitionToBeModified ProtocolIE-ID ::= 64

id-RICactionsToBeRemovedForModification-List ProtocolIE-ID ::= 65

id-RICaction-ToBeRemovedForModification-Item ProtocolIE-ID ::= 66

id-RICactionsToBeModifiedForModification-List ProtocolIE-ID ::= 67

id-RICaction-ToBeModifiedForModification-Item ProtocolIE-ID ::= 68

id-RICactionsToBeAddedForModification-List ProtocolIE-ID ::= 69

id-RICaction-ToBeAddedForModification-Item ProtocolIE-ID ::= 70

id-RICactionsRemovedForModification-List ProtocolIE-ID ::= 71

id-RICaction-RemovedForModification-Item ProtocolIE-ID ::= 72

id-RICactionsFailedToBeRemovedForModification-List ProtocolIE-ID ::= 73

id-RICaction-FailedToBeRemovedForModification-Item ProtocolIE-ID ::= 74

id-RICactionsModifiedForModification-List ProtocolIE-ID ::= 75

id-RICaction-ModifiedForModification-Item ProtocolIE-ID ::= 76

id-RICactionsFailedToBeModifiedForModification-List ProtocolIE-ID ::= 77

id-RICaction-FailedToBeModifiedForModification-Item ProtocolIE-ID ::= 78

id-RICactionsAddedForModification-List ProtocolIE-ID ::= 79

id-RICaction-AddedForModification-Item ProtocolIE-ID ::= 80

id-RICactionsFailedToBeAddedForModification-List ProtocolIE-ID ::= 81

id-RICaction-FailedToBeAddedForModification-Item ProtocolIE-ID ::= 82

id-RICactionsRequiredToBeModified-List ProtocolIE-ID ::= 83

id-RICaction-RequiredToBeModified-Item ProtocolIE-ID ::= 84

id-RICactionsRequiredToBeRemoved-List ProtocolIE-ID ::= 85

id-RICaction-RequiredToBeRemoved-Item ProtocolIE-ID ::= 86

id-RICactionsConfirmedForModification-List ProtocolIE-ID ::= 87

id-RICaction-ConfirmedForModification-Item ProtocolIE-ID ::= 88

id-RICactionsRefusedToBeModified-List ProtocolIE-ID ::= 89

id-RICaction-RefusedToBeModified-Item ProtocolIE-ID ::= 90

id-RICactionsConfirmedForRemoval-List ProtocolIE-ID ::= 91

id-RICaction-ConfirmedForRemoval-Item ProtocolIE-ID ::= 92

id-RICactionsRefusedToBeRemoved-List ProtocolIE-ID ::= 93

id-RICaction-RefusedToBeRemoved-Item ProtocolIE-ID ::= 94

id-RICqueryHeader ProtocolIE-ID ::= 95

id-RICqueryDefinition ProtocolIE-ID ::= 96

id-RICqueryOutcome ProtocolIE-ID ::= 97

END

-- ASN1STOP

### 9.3.8 Container definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Container definitions

--

-- derived from 3GPP 38.413 (NGAP)

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-Containers {

iso(1) identified-organization(3) dod(6) internet(1) private(4) enterprise(1) 53148 e2(1) version2 (2) e2ap(1) e2ap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IE parameter types from other modules.

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

IMPORTS

Criticality,

Presence,

ProtocolIE-ID

FROM E2AP-CommonDataTypes

maxProtocolIEs

FROM E2AP-Constants;

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Class Definition for Protocol IEs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-PROTOCOL-IES ::= CLASS {

&id ProtocolIE-ID UNIQUE,

&criticality Criticality,

&Value,

&presence Presence

}

WITH SYNTAX {

ID &id

CRITICALITY &criticality

TYPE &Value

PRESENCE &presence

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Class Definition for Protocol IEs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E2AP-PROTOCOL-IES-PAIR ::= CLASS {

&id ProtocolIE-ID UNIQUE,

&firstCriticality Criticality,

&FirstValue,

&secondCriticality Criticality,

&SecondValue,

&presence Presence

}

WITH SYNTAX {

ID &id

FIRST CRITICALITY &firstCriticality

FIRST TYPE &FirstValue

SECOND CRITICALITY &secondCriticality

SECOND TYPE &SecondValue

PRESENCE &presence

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Container for Protocol IEs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ProtocolIE-Container {E2AP-PROTOCOL-IES : IEsSetParam} ::=

SEQUENCE (SIZE (0..maxProtocolIEs)) OF

ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-SingleContainer {E2AP-PROTOCOL-IES : IEsSetParam} ::=

ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Field {E2AP-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE {

id E2AP-PROTOCOL-IES.&id ({IEsSetParam}),

criticality E2AP-PROTOCOL-IES.&criticality ({IEsSetParam}{@id}),

value E2AP-PROTOCOL-IES.&Value ({IEsSetParam}{@id})

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Container for Protocol IE Pairs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ProtocolIE-ContainerPair {E2AP-PROTOCOL-IES-PAIR : IEsSetParam} ::=

SEQUENCE (SIZE (0..maxProtocolIEs)) OF

ProtocolIE-FieldPair {{IEsSetParam}}

ProtocolIE-FieldPair {E2AP-PROTOCOL-IES-PAIR : IEsSetParam} ::= SEQUENCE {

id E2AP-PROTOCOL-IES-PAIR.&id ({IEsSetParam}),

firstCriticality E2AP-PROTOCOL-IES-PAIR.&firstCriticality ({IEsSetParam}{@id}),

firstValue E2AP-PROTOCOL-IES-PAIR.&FirstValue ({IEsSetParam}{@id}),

secondCriticality E2AP-PROTOCOL-IES-PAIR.&secondCriticality ({IEsSetParam}{@id}),

secondValue E2AP-PROTOCOL-IES-PAIR.&SecondValue ({IEsSetParam}{@id})

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Container Lists for Protocol IE Containers

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ProtocolIE-ContainerList {INTEGER : lowerBound, INTEGER : upperBound, E2AP-PROTOCOL-IES : IEsSetParam} ::=

SEQUENCE (SIZE (lowerBound..upperBound)) OF

ProtocolIE-SingleContainer {{IEsSetParam}}

ProtocolIE-ContainerPairList {INTEGER : lowerBound, INTEGER : upperBound, E2AP-PROTOCOL-IES-PAIR : IEsSetParam} ::=

SEQUENCE (SIZE (lowerBound..upperBound)) OF

ProtocolIE-ContainerPair {{IEsSetParam}}

END

-- ASN1STOP

## 9.4 Message transfer syntax

E2AP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ITU-T Rec. X.691 [15].

## 9.5 Timers

The following Timers are defined for use over the E2 interface in Near-RT RIC and E2 Node.

TRICEVENTcreate

- Specifies the maximum time for the RIC Subscription Request event creation procedure in the E2 Node.

TRICEVENTdelete

- Specifies the maximum time for the RIC Subscription Request event deletion procedure in the E2 Node.

TRICEVENTmodify

- Specifies the maximum time for the RIC Subscription Modification Request event request procedure in the E2 Node.

TRICcontrol

- Specifies the maximum time for the RIC Control Request event request procedure in the E2 Node.

TRICquery

- Specifies the maximum time for the RIC Query Request event request procedure in the E2 Node.

# 10 Handling of Unknown, Unforeseen and Erroneous Protocol Data

Section 10 of TS 36.413 [24] is applicable for the purposes of the present document.

# Revision history

|  |  |  |
| --- | --- | --- |
| **Date** | **Revision** | **Description** |
| 2022.11.02 | 02.03.01 | Addition of CR:  < NOK.AO-2022.09.02-WG3-CR-0017-E2AP-RIC Subscription duration limit-v06 >  < NOK-2022.09.01-WG3-CR-0016-E2AP-E1AP reference correction-v03 >, error in CR corrected (ref [21] should be 37.483)  Addition of “skin rose” to all PlantUML code to restore O-RAN look |
| 2022.11.10 | 02.03.02 | Editorial changes:  - Correction to ASN.1 (correcting error in E2APv02.03.01)  - Rearrangement of Table 8.1-1: Class 1 Elementary Procedures  - Added missing Timer definitions  Addition of CRs: < NOK-2022.06.21-WG3-CR-0014-E2AP-RIC subscription handling improvements-v06>, error in CR corrected (ASN.1 for Cause value aligned to name in 9.2.1)  < MAV.AO-2022.03.03.WG3-CR-0014.E2AP 02.03 RIC\_Subscription\_Modification procedure-v15>  <QCM.AO-2022.09.08-WG3-CR-0002-E2AP-RIC\_Query\_Procedure\_v11>, error in CR corrected (ASN.1 for Cause value aligned to name in 9.2.1) |
| 2022.11.16 | 02.03.03 | Changes reflecting remarks received during WG3 approval process  - Alignment to latest O-RAN template  - Added R003 to file name  - Updated copyright year  - Removed “RIC Action Type” from RIC Subscription Modification to align with late submitted revised CR (impacts 8.2.5, 9.1.1.11, 9.3.4)  - Corrected errors in CRs implemented in previous drafts  - Corrected ASN.1 label “gNB-CU-CP-ID” to read “gNB-CU-UP-ID” in section 9.3.5 |
|  |  |  |

# History

|  |  |  |
| --- | --- | --- |
| **Date** | **Revision** | **Description** |
| 2020.07.15 | 01.01 | Incremented version for Publication |
| 2021.08.10 | 02.00 | TSC Approved |
| 2022.02.07 | 02.01 | Version ready for Nov21 publication |
| 2022.06.29 | 02.02 | Version ready for March22 publication |
| 2022.07.20 | 02.03 | Version ready for July22 publication |