3GPP TSG-WG SA2 Meeting #147E e-meeting S2-210xxxx

Elbonia, October 18 – 22, 2021 (Revision of )

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.247** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **17.0.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **x** |

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|  |
| ***Title:***  | MBS Session Management vs MBS Session Configuration |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | 5MBS |  | ***Date:*** | 2021-09-21 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | In clause 7.1.1, there is following EN:*Editor's note: The term "configuration" can be revisited in the next meeting in clauses 7.1.1.2~7.1.1.7*Currently clause 7.1.1 has the following structure:*7.1* ***Common procedure*** *for Multicast and Broadcast**7.1.1 MBS Session* ***Management****7.1.1.1 General**7.1.1.2* ***Initial*** *MBS session* ***configuration*** *without PCC**7.1.1.3* ***Initial*** *MBS session* ***configuration*** *with PCC**7.1.1.4* ***Removal of*** *MBS session* ***configuration*** *without PCC**7.1.1.5* ***Removal of*** *MBS session* ***configuration*** *with PCC**7.1.1.6 MBS Session* ***Update*** *without PCC**7.1.1.7 MBS session* ***configuration Update*** *with PCC*In our view, #1 “Configuration” is a well-established term/concept intended for O&M or O&M-like operations in Telecom, therefore extending “configuration” to describe MBS Session management procedures is both misleading and confusing. Particularly for broadcast MBS Session, Using “configuration” to represent AF initiating MBS Session creation towards the MB-SMF and MB-SMF requesting to establish NG-RAN resource via AMF is not appropriate.#2 Using “configuration” to represent MBS Session management is inconsistent with the common understanding of session management procedures.In previous meetings, there was comment that wording “*SMF configures UPF*” is used in 23.501/23.502, which is true, however, TS 23.501 has also occurrences of “The *SMF is responsible for* ***instructing*** *the UP function…*” or similar wording, which in our view is more proper wording.There was also comment that “URSP configuration” is used in 23.501/23.502. In our view, “configuration” is used properly in URSP because it is related to UE’s configuration. It is also proposed to replace Nmbsmf\_MBSSession\_Delete with Nmbsmf\_MBSSession\_Release and replace Nnef\_MBSSession\_Delete with Nnef\_MBSSession\_Release. |
|  |  |
| ***Summary of change:*** | Use “MBS Session Creation/Update/Deletion” instead of wording with “MBS Session Configuration”Replace Nmbsmf\_MBSSession\_Delete with Nmbsmf\_MBSSession\_Release, and replace Nnef\_MBSSession\_Delete with Nnef\_MBSSession\_Release |
|  |  |
| ***Consequences if not approved:*** | Misuse of a well-established term/concept leading to inconsistent specification as well as causing confusion |
|  |  |
| ***Clauses affected:*** | 7.1.1.1, 7.1.1.2, 7.1.1.3, 7.1.1.4, 7.1.1.5, 7.1.1.6, 7.1.1.7, 9.1.3.8 , 9.4.3.4 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* START OF CHANGES \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 7.1.1 MBS Session Management

#### 7.1.1.1 General

The call flows in Clause 7.1.1 and clause 7.3 show a "NEF/MBSF", but as detailed in Annex A, there can be different related network deployment involving either only NEF, or MBSF, or both.

The interactions between "NEF/MBSF" and MB-SMF, PCF, BSF and NRF depicted in the call flows apply for NEF, MBSF or a combined NEF and MBSF, depending on network deployment. They may also apply for AF in trusted domain where NEF is not mandated.

However, the interactions between AF and "NEF/MBSF" depicted in the call flows only apply for the NEF.

Interactions between AF and MBSF based on the MB2 interface follow TS 23.468 [10].

Interactions between AF and MBSF based on the xMB interface follow TS 26.348 [11].

Services offered by the MBSF and related interactions based on that service between MBSF and AF or NEF (if MBSF and NEF are split as shown in configuration 2) are specified in TS 26.502 [18].

Detailed interactions between the MBSF or NEF and the MBSTF are specified in TS 26.502 [18].

7.1.1.2 MBS Session Creation without PCC

This procedure is used by the AF to start the MBS Session towards 5GC and consist of TMGI allocation, and MBS session creation, and they apply to both multicast and broadcast communications unless otherwise stated.

For multicast, MBS session establishment procedure triggered by UE join requests may follow the MBS session creation procedure to reserve resources towards NG-RAN. For broadcast, the MBS session creation procedure reserves resource towards the NG-RAN.

For both broadcast and multicast communication, the TMGI allocation may be separated from the MBS Session creation request.

For multicast communication, TMGI allocation procedure is applicable if TMGI is used as MBS Session ID.



Figure 7.1.1.2-1: MBS Session Creation without PCC

Steps 1 to 6 are optional and only applicable if TMGI is used as MBS Session ID and required to be pre-allocated.

1. AF sends Nnef\_TMGI\_Allocate Request (TMGI number) message to NEF/MBSF to request allocation of a TMGI(s) to identify new MBS session(s).

NOTE 1: Depending on the network deployment and use case, MB-SMF may receive requests from AF directly, or via NEF, or via MBSF, or via NEF and MBSF.

2. NEF checks authorization of AF.

NOTE 2: NEF is not required if AF is in trusted domain.

3. NEF/MBSF discovers and selects an MB-SMF using NRF or based on local configuration,

4. NEF/MBSF sends an Nmbsmf\_TMGI\_Allocate Request (TMGI number) message to the MB-SMF.

5. MB-SMF allocates TMGI(s) and returns the TMGI(s) to the NEF/MBSF via the Nmbsmf\_TMGI\_Allocate response (TMGI(s), expiration time).

6. The NEF or MBSF responds to the AF by sending an Nnef\_TMGI\_Allocate Response (TMGI(s), expiration time).

7. The AF may perform a Service Announcement towards UEs. The AF informs UEs about MBS Session information with MBS Session ID, e.g., TMGI, source specific multicast address, and possibly other information e.g., MBS service area, session description information, etc.

 The MBS service area information can be Cell ID list, TAI list, geographical area information or civic address information. Amongst them, Cell ID list and TAI list shall only be used by AFs who reside in trust domain, and when the AFs are aware of such information.

 The UE needs to be aware if the service is broadcast or multicast to decide if JOIN is to be performed.

Editor's note: How to do service announcements requires SA WG4 /WG6 coordination.

8. AF of content provider may provide description of an for an MBS session (possibly providing information for a previously allocated TMGI to NEF via a Nnef\_MBSSession\_Create request (([MBS Session ID], service type, MBS information, [TMGI allocation indication]). If step 1-6 has not been executed before, the AF may provide a source specific multicast address or it may request that the network allocates an identifier for the MBS session (i.e., TMGI). The AF provides the service type (i.e. either multicast service or broadcast service). MBS information may further include QoS requirements, for a multicast session MBS authorization information (e.g., or an indication that any UE may join), MBS service area, start and end time of the MBS session and MBS session state (active/inactive). In addition, MBS information may also indicate whether the allocation of an ingress transport address is requested.

 If geographical area information or civic address information was provided by the AF as MBS service area, NEF/MBSF translates the MBS service area to Cell ID list or TAI list.

Editor's note: What other information is to be sent by AF is FFS.

9 NEF/MBSF checks authorization of content provider.

10. NEF/MBSF discovers MB-SMF candidates and selects MB-SMF as ingress control node, possibly based on MBS service area. If a TMGI is included in step 8, NEF/MBSF finds MB-SMF based on that TMGI.

11. NEF/MBSF sends Nmbsmf\_MBSSession\_Create Request (MBS Session ID, service type, TMGI allocation indication, MBS service area information, ingress transport address request indication) to MB-SMF, to request MB-SMF to reserve ingress resources for a MBS distribution session, The NEF/MBSF provides MBS Session ID or request allocation of a TMGI, and indicate the requested service type (either multicast service or broadcast service) and MBS session state (active/inactive). It also indicates that the allocation of an ingress transport address is requested if this was requested in step 8, or if the MBSF decides to insert an MBSTF into the user plane for the MBS session. If provided in step 8, the request includes the indication that any UE may join.

 The MBS service area is provided by NEF/MBSF to the MB-SMF if provided by the AF in step 8.

12. If requested to do so, or if a source specific multicast is provided as MBS Session ID in step 11, the MB-SMF allocates a TMGI.

 If a source specific multicast is provided as MBS Session ID in step 11, the MB-SMF updates its NF profile at the NRF with the serving MBS Session ID. If an MBS service area information was received in step 11, the MB-SMF updates its NF profile at the NRF with that information.

NOTE 3: If TMGI is used to represent an MBS Session, MB-SMF does not need to update NRF if the TMGI range(s) supported by an MB-SMF is already included in the MB-SMF profile when MB-SMF register itself into NRF.

13. The MB-SMF derives the required QoS parameters locally.

14 MB-SMF selects the MB-UPF. If the allocation of an ingress transport address was requested in step 11, the MB-SMF requests the MB-UPF to reserve user plane ingress resources. If multicast transport of the MBS data towards RAN nodes is to be used, the MB-SMF also request the MB-UPF to reserve for the outgoing data a tunnel endpoint and the related identifiers (source IP address, source specific multicast address and GTP Tunnel ID) and to forward data received at the user plane ingress resource using that tunnel endpoint.

 If the allocation of an ingress transport address was not requested in step 11, the MB-SMF provides the source specific multicast address received as MBS session ID to the MB-UPF and requests the MB-UPF to join the corresponding multicast tree from the content provider. The MB-SMF may also defer the configuration to join the corresponding multicast tree e.g. based on information that the session is inactive, QoS requirements and MBS start/end time until receiving the first query for the MBS session as part of the establishment procedure in clause 7.2.1.3, or until receiving a request to activate the MBS session via the MBS Session Update procedure in clause 7.1.1.6 or 7.1.1.7..

15. If requested, MB-UPF selects an ingress address (IP address and port) and a tunnel endpoint for the outgoing data and provides it to MB-SMF.

16. For broadcast communication, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.3.1.

17. MB-SMF indicates the possibly allocated ingress address to the NEF/MBSF. MB-SMF may include TMGI if it is allocated in step 9. It also indicates the success or failure of reserving transmission resources.

18. [Optional] If the MBSF decides to use an MBSTF, the NEF/MBSF provides the ingress address received in step 18 towards the MBSTF as DL destination. If the allocation of an ingress transport address was requested in step 8, the MBSF requests the MBSTF to allocate the user plane ingress resources. If the allocation of an ingress transport address was not requested in step 8, the MBSF provides the source specific multicast address received as Multicast session ID in step 8 and requests the MBSTF to join the corresponding multicast tree from the content provider.

19. [Conditional on step 19] If requested, the MBSTF selects an ingress address (IP address and port) and provides it to NEF/MBSF.

20. The NEF/MBSF-C indicates the possibly allocated ingress address and other parameters (e.g. TMGI) to the AF via an Nnef\_MBSSession\_Create response ([TMGI], [Allocated ingress address])). If MBS Session ID is not provided in step 8, or the MBS Session ID is source specific multicast address, the NEF/MBSF provides the allocated TMGI. If AF requests the allocation of an ingress transport address, the message also includes the allocated ingress address

21. Same as step 7. The AF may also perform a service announcement at this stage.

22. For multicast communication, depending on configuration UEs can join the MBS Session as specified in clause 7.2.1.

7.1.1.3 MBS Session Creation with PCC



Figure 7.1.1.3-1: MBS Session Creation with PCC

Steps 1 to 7 are optional and only applicable if TMGI is used as MBS Session ID and required to be pre-allocated.

1. to 10: Same as in Figure 7.1.1.2-1.

11. Same as step 11 in Figure 7.1.1.2-1. In addition, the NEF/MBSF decides based on local configuration or based on parameters received in step 8 (e.g. whether the session comprises several data flows) whether it will invoke the Npcf\_MBSPolicy Authorization service for the MBS session. If so, the NEF/MBSF indicates to the MB-SMF that it will also provide a policy authorization for the MBS session to the PCF.

12. Same as step 12 in Figure 7.1.1.2-1.

13. [Optional] If the NEF/MBSF indicated in step 11 that it will also provide a policy authorization for the broadcast session to the PCF, the MB-SMF selects a PCF and sends an Npcf\_MBSPolicyControl\_Create Request (MBS session ID) for the MBS session towards the PCF, and defers step 25 until receiving an Npcf\_MBSPolicyControl\_UpdateNotify for the MBS session. Otherwise the MB-SMF decides based on local configuration whether to invoke the Npcf\_MBSPolicyControl service.

14. [Conditional on step 13] The PCF registers at the BSF that it handles the MBS session by using Nbsf\_management\_Register Request (MBS Session ID, PCF ID).. It provides an identifier that the policy association is for MBS and the MBS Session ID, its own PCF ID and optionally its PCF set ID.

15. [Optional] The PCF may retrieve preconfigured policy information for the MBS session (e.g. applicable QoS, the MBS Session-AMBR and/or default 5QI) from the UDR.

16. [Conditional on step 13] The PCF responds with Npcf\_MBSPolicyControl\_Create Request (MBS Policy, see clause 6.10) with policies for the MBS Session ID. The MBS Policy may include the Session-AMBR for the MBS session and 5QI for the MBS QoS Flow.

Editor's Note: How PCF determines the MBS policy for MBS QoS Flow without service requirement in this case is FFS.

17.-18 Same as steps 14-15 in Figure 7.1.1.2-1.

19 Same as step 17 in Figure 7.1.1.2-1.

20-21. [Optional] The NEF/MBSF uses the BSF Discovery service to discover the PCF serving the MBS session with the MBS session ID by using Nbsf\_management\_Discovery operation.

22. [Optional] The NEF/MBSF sends an Npcf\_MBSPolicy Authorization\_Create Request to PCF with the MBS session ID and MBS information:

 The PCF determines whether the request is authorized.

 If the request is authorized, the PCF derives the required QoS parameters based on the information provided by the NEF and determines whether this QoS is allowed (e.g. according to the policy input configuration in the UDR).

 If the request is not authorized or the required QoS is not allowed, the PCF indicates so in the response to the NEF

23. [Conditional] If the PCF determined updated policies for the MBS session in step 21, it update the policy information at the MB-SMF. When obtaining a request for the creation of a policy association (signal 21) for a broadcast session, for which it already performs policy control towards an MB-SMF, the PCF always provides a policy update to the MB-SMF; if no real policy update is required, the PCF repeats previous policies or sends an empty update message.

24. [Conditional] If required by the updated policies, the MB-SMF updates the MB-UPF accordingly.

25. When obtaining an MBS policy control update from the PCF (signal 23) for a broadcast session, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.3.1 to request the allocation of resources to for the transmission of the broadcast session.

26.-30 Same as steps 18-22 in Figure 7.1.1.2-1.

Editor's note: AF sends a create message in step 8 and get a response in step 26. How to avoid the potential procedure handling failure is FFS.

NOTE: Steps 26-27 can be executed in parallel to steps 20-25.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* NEXT CHANGES \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

7.1.1.4 MBS Session Release without PCC

This procedure is used by the AF to release the MBS Session. This procedure may also include TMGI de-allocation. The procedures apply to both multicast and broadcast communications unless otherwise stated. This procedure releases the reserved resources in both 5GC and NG-RAN.



Figure 7.1.1.4-1: MBS Session Release without PCC

1. AF of content provider may request to release the MBS session (MBS Session ID).

2/3. If an MBSTF was inserted into the user plane, the MBSF request the MBSTF to release user plane resources.

4. NEF/MBSF requests MB-SMF to release resources for the MBS session.

5. For broadcast session, the MB-SMF triggers resource release towards the AMFs as specified in clause 7.3.2. For multicast session, the MB-SMF triggers resource release towards the SMFs as specified in clause 7.2.2.3.

6/7. MB-SMF requests the MB-UPF to release user plane resources.

8. [Conditional] If MB-SMF configured the profile with an MBS session ID when the MBS session was configured, the MB-SMF updates its NF profile at NRF to release the MBS Session ID.

9. MB-SMF responds to the NEF/MBSF.

10. The NEF/MBSF responds to the AF.

11. [Optional] AF requests NEF/MBSF to de-allocate TMGI(s),

12. [Conditional on step 11] NEF/MBSF forwards request to de-allocate TMGI(s) to MB-SMF.

13. [Conditional on step 12] The MB-SMF responds to the NEF or MBSF by sending a de-allocate TMGI Response message.

14. [Conditional on step 13] NEF or MBSF forwards de-allocate TMGI Response message to AF.

7.1.1.5 MBS Session Release with PCC

This procedure is used by the AF to release the MBS Session. This procedure may also include TMGI de-allocation. The procedures apply to both multicast and broadcast communications unless otherwise stated. This procedure releases the reserved resources in both 5GC and NG-RAN.



Figure 7.1.1.5-1: MBS Session Release with PCC

1-3 Same as in Figure 7.1.1.4-1

4. The NEF/MBSF sends an NMBSPolicyAuthorization\_Delete Request to the PCF that handles the Policy of the MBS Session.

5. The PCF sends an Npcf\_MBSPolicyControl\_UpdateNotify Request to MB-SMF to release the MBS Policy Control Association.

6-9. Same as steps 5-8 in Figure 7.1.1.4-1

10. The MB-SMF sends the Npcf\_MBSPolicyControl\_UpdateNotify Response to the PCF.

11. The PCF de-registers at the BSF that it handles the MBS session.

12. The PCF sends an NpcfMBSPolicyAuthorization\_Delete Response to the NEF/MBSF.

13-17. Same as steps 11-15 in Figure 7.1.1.4-1.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* NEXT CHANGES \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

7.1.1.6 MBS Session Update without PCC

This procedure is used by the AF to update the MB service area and/or update QoS of an MBS Session. Updating QoS of an MBS Session may lead to addition of new MBS QoS Flow(s). The procedure applies to both multicast and broadcast communications unless otherwise stated.



Figure 7.1.1.6-1: MBS Session Update without PCC

1. AF of content provider initiates MBS Session Update to a NEF/MBSF, e.g. to update MBS service area and/or update service requirement, or to activate or deactivate an MBS session. AF may provide updated information for an MBS session (identified by MBS session ID) by sending MBS Session update request ([MBS Session ID], MBS information, AF Identifier). MBS information may include service requirements, MBS service area information, and media information. The service requirements adjustment may lead to addition of new MBS QoS Flow(s), removal of existing MBS QoS Flow(s) or update of existing MBS QoS Flow(s).

2. NEF checks authorization of AF.

3. NEF/MBSF forward the MBS Session Update request to MB-SMF.

4. The MB-SMF derives any updated QoS parameters locally.

5-6. MB-SMF may need to update MB-UPF, e.g. if new MBS QoS Flow is to be created, or existing MBS QoS Flow is to be deleted.

7. For broadcast communication, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.3.3. For multicast communication, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.2.5 (for service activation/deactivation), 7.2.6 (for QoS updates) and 7.2.x (for service area updates).

8. If an MBS service area is being updated, the MB-SMF stores the new service area in its profile at the NRF.

9. MB-SMF responds to the MBS Session Update.

10. NEF/MBSF responds to the MBS Session Update.

7.1.1.7 MBS Session Update with PCC

**Figure 7.1.1.7-1: MBS Session Update with PCC**

1-2. Same as in Figure 7.1.1.6-1.

For updates of MBS service area and/or MBS session activation/deactivation steps 3 to 6 apply

3. NEF/MBSF forward the MBS Session Update request to MB-SMF, removing any updates not related to MBS service area and/or MBS session activation/deactivation

4. For broadcast communication, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.3.3. For multicast communication, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.2.5 (for service activation/deactivation), and 7.2.x (for service area updates).

5. If an MBS service area is being updated, the MB-SMF stores the new service area in its profile at the NRF.

6. MB-SMF responds to the MBS Session Update.

For other updates of the service description and QoS related updates, steps 7 to 12 apply.

7. NEF/MBSF updates the MBS policy Authorization for the MBS session at the PCF and provides the input received from the AF, removing any updates related to MBS service area and/or MBS session activation/deactivation, by sending Npcf\_MBSPolicyAuthorization\_Update Request message (MBS Session ID, service requirement).

8. Based on the input received in step 7, the PCF may provide updated policy rules to the MB-SMF by issuing Npcf\_MBSPolicyControl\_UpdateNotify request message including the updated policy information about the MBS Session.

9-10. Same as steps 5-6 in Figure 7.1.1.6-1.

11. For broadcast communication, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.3.3. For multicast communication, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.2.6 (for QoS updates).

12. The PCF sends the Npcf\_MBSPolicyAuthorization\_Update response to the NEF/MBSF.

13. Same as step 10 in Figure 7.1.1.6-1

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* NEXT CHANGES \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#### 9.1.3.8 Nmbsmf\_MBSSession\_ Release service operation

**Service operation name:** Nmbsmf\_MBSSession\_Release

**Description:** Release the multicast session or broadcast session. The session is released and a possible subscription to notifications is terminated.

**Input, Required:** MBS Session ID.

**Input, Optional:** None.

**Output, Required:** Result Indication.

**Output, Optional:** Cause.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* NEXT CHANGES \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

9.4.3.4 Nnef\_MBSSession\_Release service operation

**Service operation name:** Nnef\_MBSSession\_Release

**Description:** This service is used **to** release the multicast or broadcast MBS session.

**Input, Required:** MBS Session ID.

**Input, Optional:** None.

**Output, Required:** Result Indication.

**Output, Optional:** Cause.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* END OF CHANGES \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*