**3GPP TSG-SA5 Meeting #131e *S5-203177***

**e-meeting 25th May-3rd June 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **32.422** | **CR** | **0334** | **rev** | **-** | **Current version:** | **16.1.0** |  |
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| *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 | **X** | Core Network | **X** |

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| ***Title:***  | Clean up of the editor notes |
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| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | TEI12 |  | ***Date:*** | 2020-05-09 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***Release:*** | Rel-16 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | The trace and MDT work for Rel-16 is finalized while some editor’s notes are still left over in related specifications. |
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| ***Summary of change:*** | Remove the editor’s notes in TS 32.422. |
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| ***Consequences if not approved:*** | The editor’s notes are left over in the specification. |
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| ***Clauses affected:*** | 4.1.2.9.1, 4.1.2.9.2, 4.1.2.9.4, 4.1.4.6.3, 4.2.2.4, 4.2.3.5.2, 4.2.4.4, 4.2.5.6 |
|  |  |
|  | **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 ...  |
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| ***Other comments:*** |  |
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| ***This CR's revision history:*** |  |

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| **1st of Changes** |

##### 4.1.2.9.1 General

Figure 4.1.2.9.1.1 illustrates signalling based activation for service level tracing within a home IM CN SS and a visited IM CN SS. An arrow with "Trace Parameter Configuration" represents the availability of the trace functionality at the EM for that domain. Similarly, An arrow with "Trace Parameter Propagation" represents the ability to propagate trace parameters only for the interfaces indicated.



Figure 4.1.2.9.1.1: Overview of Signalling Activation for service level tracing for IMS

Trace Activation shall be initiated from the Core Network EM only [EM (UE), and EM (HSS)].

The EM (UE) and the interactions between the EM (UE) and the UE shall be achieved using OMA Device Management [18].

When service level tracing for IMS is required for a registered home subscriber in the home IM CN SS Trace Session activation shall go to the UE and the HSS. The HSS shall propagate the Trace Session activation to the S-CSCF, I-CSCF and the AS.

The S-CSCF and I-CSCF shall propagate the Trace Session activation to the P-CSCF. The Trace Session activation shall be propagated to the MRF, MGCF and BGCF via the S-CSCF. When an IMS NE (i.e. S/I/P-CSCF, AS, HSS, MRF, MGCF, BGCF) receives Trace Session activation it shall save the received Trace control and configuration parameters and shall start a Trace Session.

When service level tracing for IMS is required for a registered home subscriber in a visited IM CN SS Trace Session activation shall go to the UE and the HSS. The HSS shall propagate the Trace Session activation to the S-CSCF, I-CSCF and the AS. The I-CSCF may prohibit the propagation of the Trace Session activation from the home IM CN SS to the P-CSCF in the visited IM CN SS.

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| **2nd of Changes** |

##### 4.1.2.9.2 Trace session activation for non-registered UE

Figure 4.1.2.9.2.1 illustrates the sending of Trace Session activation towards the HSS, S-CSCF, I-CSCF, AS and
P-CSCF during the registration of a UE with the IM CN SS.

As described in 3GPP TS 23.228 [15] for the purposes of signalling flows the user is considered always to be roaming. For a user roaming in their home network, the home network shall perform the role of the visited network elements and the home network elements.

NOTE: For detailed information of application level registration procedures for IMS see 3GPP TS 23.228 [15].



Figure 4.1.2.9.2.1: Trace Session activation for non-registered user

When HSS receives Trace Session activation from its EM (Step 1), it shall update the user information associated with the user for whom the trace is to be applied (Step 2). The HSS shall store the received trace control and configuration parameters (Step 3). At this point a Trace Session shall be started in the HSS.

When the EM sends the Trace Session activation to the HSS it shall include the following trace and configuration parameters in the message:

- Public User Identity (i.e. Identity of user initiating/terminating the service to be traced) (M)

- Service identification (M)

- Trace reference (M)

- Triggering events for HSS (M)

- Trace depth (M)

- List of NE types (M)

- Triggering events for S-CSCF (M), I-CSCF (M), P-CSCF (M), AS (M), BGCF (M), MRF (M), MGCF (M)

- Trace depth (M)

When the EM sends the Trace Session activation to the HSS it may include the following trace and configuration parameters in the message if required:

- List of interfaces for HSS (O)

- List of interfaces for S-CSCF (O), I-CSCF (O), P-CSCF (O), AS (O), BGCF (O), MRF (O), MGCF (O).

As described in 3GPP TS 23.228 [15] when a UE registers with the network by sending a REGISTER message (Steps 4 to 10), the HSS sends Service Control (user and filter information) to the S-CSCF (Steps 11). It shall also propagate trace control and configuration parameters to the S-CSCF. At this point a Trace Session shall be started in the S-CSCF (Step 12).

When the HSS sends the Cx-Put-Response operation to the S-CSCF (see 3GPP TS 29.228 [16]) it shall include the following trace and configuration parameters:

- Public User Identity (i.e. Identity of user initiating/terminating the service to be traced) (M)

- Service identification (M)

- Trace reference (M)

- Triggering events for S-CSCF (M)

- Trace depth (M)

- List of NE types (M)

- Triggering events for I-CSCF (M), P-CSCF (M), BGCF (M), MGCF (M)

When the HSS sends the Cx-Put-Response operation to the S-CSCF it may include the following trace and configuration parameters if required:

- List of interfaces for S-CSCF (O)

- List of interfaces for I-CSCF (O), P-CSCF (O), BGCF (O), MGCF (O)

As described in 3GPP TS 23.218 [14] on reception of a REGISTER request, the S-CSCF shall send a third-party REGISTER request to the Application Server if the registration request from the user matches a contained trigger as downloaded from the HSS (Step 13 and 14).

As described in 3GPP TS 29.328 [17] the Application Server shall request from the HSS information such as service and user related information. In this case, the HSS shall determine that a trace request for the user is active and shall return to the Application Server trace control and configuration parameters (Step 16). At this point a Trace Session shall be started in the AS (Step 17).

When the HSS sends the Sh-Pull-Response operation to the AS (see 3GPP TS 29.328 [17]) it shall include the following trace and configuration parameters:

* Public User Identity (i.e. Identity of user initiating/terminating the service to be traced) (M).
* Service identification (M)
* Trace reference (M)
* Triggering events for AS (M)
* Trace depth (M)
* List of NE types (M)
* Triggering events for MRF (M)

When the HSS sends the Sh-Pull-Response operation to the AS it may include the following trace and configuration parameters if required:

* List of interfaces for AS (O)
* List of interfaces for MRF (O)

Upon successful registration the S-CSCF shall return a SIP 200 OK and shall propagate the received trace control and configuration parameters to the I-CSCF (Step 18). At this point a Trace Session shall be started in the I-CSCF (Step 19).

When the S-CSCF sends the 200 OK (Register) message to the I-CSCF (see 3GPP TS 24.228 [15]) it shall include the following trace and configuration parameters:

* Public User Identity (i.e. Identity of user initiating/terminating the service to be traced) (M).
* Service identification (M)
* Trace reference (M)
* Trace depth (M)
* Triggering events for I-CSCF (M)
* List of NE types (M)
* Triggering events for P-CSCF (M)

When the S-CSCF sends the 200 OK (Register) message to the I-CSCF it may include the following trace and configuration parameters if required:

* List of interfaces for I-CSCF (O)
* List of interfaces for P-CSCF (O)

If the P-CSCF resides in the same (i.e. home IM CN SS) network as the I-CSCF, the I-CSCF forwards the SIP 200 OK and shall propagate the retrieved trace control and configuration parameters to the P-CSCF (Step 20). At this point a Trace Session shall be started in the P-CSCF (Step 21).

When the I-CSCF sends the 200 OK (Register) message to the P-CSCF (see 3GPP TS 24.228 [15]) it shall include the following trace and configuration parameters:

* Public User Identity (i.e. Identity of user initiating/terminating the traced service) (M)
* Service identification (M)
* Trace reference (M)
* Trace depth (M)
* Triggering events for P-CSCF (M)
* List of NE types (M)

When the I-CSCF sends the 200 OK (Register) message to the P-CSCF it may include the following trace and configuration parameters if required:

* List of interfaces for P-CSCF (O).

If the P-CSCF resides in a different (i.e. visited IM CN SS) network as the I-CSCF, the I-CSCF forwards the SIP 200 OK and may propagate the retrieved trace control and configuration parameters to the P-CSCF. If the P-CSCF is in a different network than the I-CSCF and the sending of trace control and configuration parameters from the home IM CN SS to the visited IM CN SS is prohibited then the I-CSCF shall restrict the sending of the trace control and configuration parameters.

The P-CSCF shall forward the SIP 200 OK to the UE. The P-CSCF shall not send the retrieved trace control and configuration parameters.

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| **3rd of Changes** |

##### 4.1.2.9.4 Trace session activation at the UE

Figure 4.1.2.9.4.1 illustrates the sending of Trace Session activation from the Device Management Server (DMS) to a UE and the subsequent propagation of a SIP message including a start trigger event from the UE and the P-CSCF.



Figure 4.1.2.9.4.1: Trace Session activation at a UE

A management session shall be established (Step 1) in accordance with OMA Device Management [18]. When a UE receives Trace Session Activation (Step 2) as part of the received management operation it shall store the Trace Control and configuration parameters, and may (e.g. depending on Operator conditions) start a trace session (Step 3).

When any of the triggering events occur at the UE (e.g. the service to be traced from the traced UE is initiated), and when the condition(s) as defined by the trace control and configuration parameters within the received management operation occur, the UE shall start a trace recording (Step 4). As described in subclause 4.2.3.5 the UE shall include in the outgoing SIP (service) signalling message (e.g. INVITE) a Start Trigger Event (Step 5).

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| **4th of Changes** |

##### 4.1.4.6.3 Trace session deactivation at the UE

The EM (UE) and the interactions between the EM (UE) and the UE shall be achieved using OMA Device Management [18].

Figure 4.1.4.6.3.1 illustrates the sending of Trace Session Deactivation from the Device Management Server (DMS) to a UE.



Figure 4.1.4.6.3.1: Trace session deactivation at a UE

Trace Session deactivation shall be initiated from the Device Management Server (DMS). The same DMS that initiated Trace Session activation shall initiate a Trace Session deactivation in the same UE (Step 1).

When a UE receives Trace Session Deactivation as part of the received management operation from its DMS (Step 2) it may deactivate the Trace Session (Step 3).

If a Trace Recording Session(s) within the Trace session is active at the time of receiving a Trace Session deactivation, the UE may stop the trace recording session(s) immediately (see note), or it may choose to continue the Trace Recording Session(s) until the session(s) end gracefully (e.g. the SIP session ends after a specific period of time, or upon completion of a SIP session and the reception of a SIP BYE).

NOTE: When the Trace session is stopped the UE may deactivate or delete its management operation.

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| **5th of Changes** |

#### 4.2.2.4 Void

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| **6th of Changes** |

##### 4.2.3.5.2 Starting mechanism at the UE

For a UE that has an active trace session (see subclause 4.1.2.9.4) one or more trace recording session(s) (e.g. to allow the tracing for several different simultaneous services) shall be started when any of the defined triggering events occur at the UE, and when the condition(s) as defined by the trace control and configuration parameters within the received management operation occur.

A Trace recording session(s) may be initiated at an originating UE when:

1. The UE detects the initiation of the specified service to be traced. The service may be initiated either by the end user or by an application.

The triggering events at a terminating UE include:

1. The UE detects the initiation of the specified service to be traced. The service may be initiated either by the end user or by an application.
2. The UE detects the reception of an incoming SIP message containg the service level tracing Start Triggering Event.

A Trace recording session(s) may be initiated at a UE (both originating and terminating) when it detects a start trigger event initiated directly by the Device Management server for the purpose of allowing not only SIP information related to the service to be traced, but also information relating to the processes performed by the UE to support the initialization of the service.

Upon the detection of a triggering event the UE shall include in the appropriate outgoing SIP (service) signalling message (i.e. the outgoing signalling messages associated with the service to be traced) a service level tracing Start Triggering Event.

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| **7th of Changes** |

#### 4.2.4.4 Void

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| **8th of Changes** |

#### 4.2.5.6 Service level tracing Trace session deletion and trace retrieval

As described in clause 4.1.4.6.3, Trace Session deactivation shall be initiated from the Device Management Server. Following the completion of any trace recording sessions at the UE and during the subsequent deactivation of the Trace Session, the UE shall indicate to the Device Management server that Trace Records are available for retrieval.

Once the Trace records have been retrieved the management object may be deleted from the UE.

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| **End of Change** |