**3GPP TSG-SA WG6 Meeting #55 S6-23xxxx**

**22 – 26 May 2023 Berlin, Germany (revision of S6-23xxxx)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.558** | **CR** | **0XXX** | **rev** | **-** | **Current version:** | **18.2.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Edge performance prediction | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | S6 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | EDGEAPP\_Ph2 | | | | |  | ***Date:*** | | | 2023-05-10 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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 can be 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | During EAS discovery or T-EAS discovery, the EES may utilize ADAES service to have analytics for edge load in the discovered EAS(s).  The edge load performance analytics from ADAES can be either statistics or predictions.  So far in service continuity planning, it is not possible for EES to know when the analytics prediction should be computed.  In addition, for EAS dyanamic info change in EAS discovery subscription, it is not supported to give a concreate EAS instance endpoint and utilize analytics. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Allow consumer (e.g. EEC, EAS, or EES) to supply prediction expiration time in the T-EAS discovery request in service continuity procedure so that producer EES can offer more appropriate candidate EAS(s) to the consumer considering the prediction expiration time;  Allow the EEC to supply prediction expiration time in initial EAS discovery request to EES so that the EES can offer more appropriate candidate EAS(s) to the EEC considering the prediction expiration time;  Similarly, in EAS discovery subscribe-notify procedure, the EEC can supply prediction expiration time to the EES so that the EES can offer more appropriate candidate EAS(s) to the EEC considering the predicted expiration time.  In addition, the EAS status monitoring for EAS instance(s) are added in dynamic EAS info change subscription and prediction information is added in report. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Prediction without considering when UE is expected to arrive at target EAS service area will lead to wrong decision in EES to offer candidate T-EAS(s) or select T-EAS in service continuity or to offer candidate EAS(s) or select EAS in initial EAS discovery. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 8.5.2.2, 8.5.2.3.2, 8.5.2.3.3, 8.5.2.3.4, 8.5.3.2, 8.5.3.4, 8.5.3.6, 8.5.3.7, 8.8.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

#### 8.5.2.2 Request-response model

Pre-conditions:

1. The EEC has received information (e.g. URI, IP address) related to the EES;

2. The EEC has received appropriate security credentials authorizing it to communicate with the EES as specified in clause 8.11; and

3. The EES is configured with ECSP's policy for EAS discovery.

NOTE 1: Details of ECSP's policy are out of scope.



Figure 8.5.2.2-1: EAS Discovery procedure

1. The EEC sends an EAS discovery request to the EES. The EAS discovery request includes the requestor identifier [EECID] along with the security credentials and may include EAS discovery filters and may also include UE location to retrieve information about particular EAS(s) or a category of EASs, e.g. gaming applications, or Edge Applications Server(s) available in certain service areas, e.g. available on a UE's predicted or expected route. The request may include an EAS selection request indicator or UE type or prediction expiration time.

2. Upon receiving the request from the EEC, the EES checks if the EEC is authorized to discover the requested EAS(s). The authorization check may apply to an individual EAS, a category of EASs or to the EDN, i.e. to all the EASs. If UE's location information is not already available, the EES obtains the UE location by utilizing the capabilities of the 3GPP core network as specified in clause 8.10.3. If EAS discovery filters are provided by the EEC, the EES identifies the EAS(s) based on the provided EAS discovery filters and the UE location.

When the bundle EAS information is provided, then;

- If bundle EAS information includes EAS bundle identifier, the EES identifies all or part of the EAS(s) associated the same EAS bundle identifier.

- If bundle EAS information includes a list of EASIDs, the EES identifies the EASs which are all or part of the EAS bundle.

If the EEC indicates that service continuity support is required, the EES shall take the indication which ACR scenarios are supported by the AC and the EEC and which of these are preferred by the AC into consideration. The EES may select one EAS and determine whether to perform application traffic influence for this AC based on AC's service KPI or EAS’s service KPI in desired response time, when the EAS does not perform traffic influence in advance.

When EAS discovery filters are not provided, then:

- if available, the EES identifies the EAS(s) based on the UE-specific service information at the EES and the UE location;

- EES identifies the EAS(s) by applying the ECSP policy (e.g. based only on the UE location);

NOTE 2: Details of the UE-specific service information and how it is available at the EES is out of scope.

NOTE 3: Both steps are evaluated prior to sending a response.

Upon receiving the request from the EEC, if the EEC does not indicate EAS Instantiation Triggering Suppress in the EAS Discovery request, the EES may trigger the EAS management system to instantiate the EAS that matches with EAS discovery filter IEs (e.g. ACID) as in clause 8.12.

Otherwise, upon receiving the request from the EEC, if the EEC indicates EAS Instantiation Triggering Suppress in the EAS Discovery request and the EES supports such capability, the EES may determine Instantiable EAS Information for EAS(s) that are instantiable but not yet instantiated and match the EAS discovery filter IEs. Instantiable EAS Information is provided in the EAS Discovery response and includes the EASID(s) and, for each EASID, the status indicating wether the EAS is instantiated or instantiable but not yet instantiated.

If the EEC provides in the EAS discovery request the EAS selection request indicator, the EES selects EAS satisfying the EAS discovery filter or based on other information (e.g. ECSP policy) as described above (if no EAS discovery filter received), and then provides the selected EAS information to the EEC in the discovered EAS list of EAS discovery response.

NOTE 4: Without EAS selection request indication, the EES handling is as per R17 procedure.

3. If the processing of the request was successful, the EES sends an EAS discovery response to the EEC, which includes information about the discovered EASs and Instantiable EAS Information. For discovered EASs, this includes endpoint information. Depending on the EAS discovery filters received in the EAS discovery request, the response may include additional information regarding matched capabilities, e.g. service permissions levels, KPIs, AC locations(s) that the EASs can support, ACR scenarios supported by the EAS, etc. The EAS discovery response may contain a list of EASs and Instantiable EAS Information. This list may be based on EAS discovery filters containing a Geographical or Topological Service Area, e.g. a route, included in the EAS discovery request by the EEC.

If the EES is unable to determine the EAS information using the inputs in the EAS discovery request, UE-specific service information at the EES or the ECSP policy, the EES shall reject the EAS discovery request and respond with an appropriate failure cause.

If the EEC is not registered with the EES, and ECSP policy requires the EEC to perform EEC registration prior to EAS discovery, the EES shall include an appropriate failure cause in the EAS discovery response indicating that EEC registration is required.

If the UE location and predicted/expected UE locations, provided in the EAS discovery request, are outside the Geographical or Topological Service Area of an EAS, then the EES shall not include that EAS in the discovery response. The discovery response may include EAS(s) that cannot serve the UE at its current location if a predicted/expected UE location was provided in the EAS discovery request.

Upon receiving the EAS discovery response, if the EEC selects an EAS which is instantiated (i.e., an EAS profile was provided), the EEC uses the endpoint information for routing of the outgoing application data traffic to EAS(s), as needed, and may provide necessary notifications to the AC(s). The EEC may use the border or overlap between EAS Geographical Service Areas for service continuity purposes. The EEC may cache the EAS information (e.g. EAS endpoint) for subsequent use and avoid the need to repeat step 1. If the Lifetime IE is included in the response, the EEC may cache the EAS information only for the duration specified by the Lifetime IE.

Upon receiving the EAS discovery response, if the EEC selects an EAS which is not instantiated (i.e. an EAS profile is not provided), the EEC sends the EAS information provisioning request indicating the selected EASID as in clause 8.15.

NOTE 5: Within the duration specified by the Lifetime IE, the cached EAS Profile can be updated (e.g. according to notifications from the EES for changes of EAS information due to EAS status change) or the cached EAS Profile can be invalidated due to new EAS information discovery (e.g. due to UE mobility). The EEC can update or invalidate the cached EAS information (e.g. on PDU Session Release or Modification Command).

NOTE 6: The AC can cache the EAS information (e.g. EAS endpoint) for subsequent use. In the case of the cached information needing to be updated or invalidated, the mechanisms for the EEC to notify the AC is up to implementation and is not specified in the current release of the present document.

NOTE 7: The EEC can use the EAS information provided by the discovery procedure to perform service continuity planning, for example when ultra-low latency ACR is required.

If the EAS discovery request fails, the EEC may resend the EAS discovery request, taking into account the received failure cause. If the failure cause indicated that EEC registration is required, the EEC shall perform an EEC registration before resending the EAS discovery request.

NOTE 8: As long as a proper EAS (e.g. considering expected AC service KPIs included in EAS discovery request) is discovered and selected by the EES, EEC of a constraint UE can stop sending EAS discovery to rest candidate EES(s), and provide the selected EAS information to AC.

\* \* \* Next Change \* \* \* \*

##### 8.5.2.3.2 Subscribe

Figure 8.5.2.3.2-1 illustrates the EAS discovery subscription procedure between the EEC and the EES. This subscription enables EES to inform EEC of various EAS discovery related events of interest to EEC (e.g. EAS discovery notification and EAS dynamic information).

Pre-conditions:

1. The EEC has received information (e.g. URI, IP address) related to the EES;

2. The EEC has received appropriate security credentials authorizing it to communicate with the EES as specified in clause 8.11;

3. The EES is configured with ECSP's policy for EAS discovery; and

4. The EEC has optionally acquired a Notification Target Address to be used in its subscriptions to notifications.

NOTE 1: Details of ECSP's policy are out of scope.

NOTE 2: How the EEC acquires the notification target address or a notification channel URI to receive the notifications is out of scope of this release. The notification target address can terminate at the EEC (e.g. in an IoT device) if the deployment supports EEC reachability, or it can terminate at a push notification service. Details of the push notification service are out of scope of this release.



Figure 8.5.2.3.2-1: EAS discovery subscription

1. The EEC sends an EAS discovery subscription request to the EES. The EAS discovery subscription request includes the EECID along with the security credentials, Event ID, and may include EAS discovery filters and EAS dynamic information filters to subscribe to information about particular EAS(s) or a category of EASs (e.g. gaming applications) or dynamic information about EAS(s). For EAS availability event, the request may include prediction expiration time. For EAS dynamic information change event, the request may include a prediction request.

2. Upon receiving the request from the EEC, the EES checks if the EEC is authorized to subscribe for information of the requested EAS(s). The authorization check may apply to an individual EAS, a category of EASs or to the EDN, i.e. to all the EASs. The EES may utilize the capabilities (e.g. UE location) of the 3GPP core network as specified in clause 8.10.3. If the request is authorized, the EES creates and stores the subscription for EAS discovery.

3. If the processing of the request was successful, the EES sends an EAS discovery subscription response to the EEC, which includes the subscription identifier and may include the expiration time, indicating when the subscription will automatically expire. To maintain the subscription, the EEC shall send an EAS discovery subscription update request prior to the expiration time. If an EAS discovery subscription update request is not received prior to the expiration time, the EES shall treat the EEC as implicitly unsubscribed.

If the request includes prediction expiration time, the EES should notify the EEC before prediction time expires.

In the case of subscription to an EAS availability change event, if there is no instantiated EAS that matches the requested EAS discovery filters and such EAS is instantiable based on the pre-configured information about instantiable EASs, the request is treated as successful. If the EEC indicates EAS Instantiation Triggering in the EAS discovery subscription request, the EES may trigger dynamic instantiation of the EAS as specified in the clause 8.12; otherwise, the EES does not trigger the EAS instantiation.

In the case of subscription to an EAS dynamic information change event, if the EES is unable to determine the instantiated EAS information using the inputs in the EAS discovery subscription request, UE-specific service information at the EES or the ECSP policy, the EES shall reject the EAS discovery subscription request and respond with an appropriate failure cause.

If the EEC is not registered with the EES, and ECSP policy requires the EEC to perform EEC registration prior to EAS discovery, the EES shall include an appropriate failure cause in the EAS discovery response indicating that EEC registration is required.

If the EAS discovery subscription request fails, the EEC may resend the EAS discovery subscription request again, taking into account the received failure cause. If the failure cause indicated that EEC registration is required, the EEC shall perform an EEC registration before resending the EAS discovery subscription request.

\* \* \* Next Change \* \* \* \*

##### 8.5.2.3.3 Notify

Figure 8.5.2.3.3-1 illustrates the EAS discovery notification procedure between the EEC and the EES.

Pre-conditions:

1. The EEC has subscribed with the EES for the EAS discovery information as specified in clause 8.5.2.3.2.



Figure 8.5.2.3.3-1: EAS discovery notification

1. An event occurs at the EES that satisfies trigger conditions for notifying (e.g. to provide EAS discovery information or EAS dynamic information) a subscribed EEC. If UE's location information is not already available, the EES obtains the UE location by utilizing the capabilities of the 3GPP core network as specified in clause 8.10.2. If EAS discovery filters were provided by the EEC during subscription creation, the EES identifies the EAS(s) based on the provided EAS discovery filters and the UE location.

For EAS availability event, the EES may also collect edge load analytics from ADAES (as specified in clause 8.8.2 of TS 23.436) or performance data from OAM to find whether the EAS(s) satisfies the Expected AC service KPIs or the Minimum required AC Service KPIs.

For EAS dynamic information change event, the EES, considering EEC prediction request and/or local policy, may use received EAS endpoints from EEC or all registered EAS endpoints in consuming ADAES services (e.g. as specified in clause 8.8.2 of TS 23.436) to monitor EAS service status like EAS status and EAS schedule.

When the bundle EAS information is provided, then;

* If EAS bundle identifier was provided, the EES identifies all or part of the EAS(s) associated with the same EAS bundle identifier.
* If a list of EASIDs is provided, the EES identifies the EASs which are all or part of the EAS bundle.

If the EEC indicates that service continuity support is required, the EES shall take the indication which ACR scenarios are supported by the AC and the EEC and which of these are preferred by the AC into consideration.

If EAS discovery filters were not provided, then:

- if available, the EES identifies the EAS(s) based on the UE-specific service information at the EES and the UE location;

- EES identifies the EAS(s) by applying the ECSP policy (e.g. based only on the UE location);

NOTE 1: Details of the UE-specific service information and how it is available at the EES is out of scope.

NOTE 2: Both steps are evaluated prior to sending a response.

If the UE is located outside the Geographical or Topological Service Area of an EAS, then the EES shall not include this EAS in the EAS discovery notification.

2. The EES sends an EAS discovery notification to the EEC with the EAS information determined in step 1.

\* \* \* Next Change \* \* \* \*

##### 8.5.2.3.4 Subscription update

Figure 8.5.2.3.4-1 illustrates the EAS discovery subscription update procedure between the EEC and the EES.

Pre-conditions:

1. The EEC has subscribed with the EES for the EAS discovery information as specified in clause 8.5.2.3.2



Figure 8.5.2.3.4-1: EAS discovery subscription update

1. The EEC sends an EAS discovery subscription update request to the EES. The EAS discovery subscription update request includes the security credentials and the subscription identifier. It may also include EAS discovery filters, EAS dynamic information filters, prediction expiration time and/or proposed expiration time for the updated subscription.

2. Upon receiving the request from the EEC, the EES checks if the EEC is authorized to update the subscription information. The EES may utilize the capabilities (e.g. UE location) of the 3GPP core network as specified in clause 8.10.3. If the request is authorized, the EES updated the stored subscription for EAS discovery.

3. The EES sends an EAS discovery subscription update response to the EEC, which may include the expiration time, indicating when the updated subscription will automatically expire. To maintain the subscription, the EEC shall send an EAS discovery subscription update request prior to the expiration time. If an EAS discovery subscription update request is not received prior to the expiration time, the EES shall treat the EEC as implicitly unsubscribed.

\* \* \* Next Change \* \* \* \*

#### 8.5.3.2 EAS discovery request

Table 8.5.3.2-1 describes information elements for the EAS discovery request. Table 8.5.3.2-2 provides further detail about the EAS Discovery Filter information element.

Table 8.5.3.2-1: EAS discovery request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Requestor identifier | M | The ID of the requestor (e.g. EECID) |
| UE Identifier | O | The identifier of the UE (i.e. GPSI or identity token) |
| Security credentials | M | Security credentials resulting from a successful authorization for the edge computing service. |
| EAS discovery filters | O | Set of characteristics to determine required EASs, as detailed in Table 8.5.3.2-2. |
| UE location | O | The location information of the UE. The UE location is described in clause 7.3.2. |
| Serving MNO information (NOTE 2) | O | The serving MNO information (e.g. MNO name, PLMN ID) which is serving the subscriber. |
| Target DNAI (NOTE 1) | O | Target DNAI information which can be associated with potential T-EAS(s) |
| EEC Service Continuity Support | O | Indicates if the EEC supports service continuity or not. The IE also indicates which ACR scenarios are supported by the EEC or, if this message is sent by the EEC to discover a T‑EAS, which ACR scenario(s) are intended to be used for the ACR. |
| EES Service Continuity Support (NOTE 1) | O | The IE indicates if the S-EES supports service continuity or not. The IE also indicates which ACR scenarios are supported by the S-EES or, if the EAS discovery is used for an S‑EES executed ACR according to clause 8.8.2.5, which ACR scenario is to be used for the ACR. |
| EAS Service Continuity Support (NOTE 1) | O | The IE indicates if the S-EAS supports service continuity or not. The IE also indicates which ACR scenarios are supported by the S-EAS or, if the EAS discovery is used for an S‑EAS decided ACR according to clause 8.8.2.4, which ACR scenario is to be used for the ACR. |
| EAS Instantiation Triggering Suppress | O | Indicates to the EES that EAS instantiation triggering should not be performed for the current request. |
| EAS selection request indicator | O | Indicates the request for EAS selection support from the EES (e.g., for constrained device). |
| Prediction expiration time | O | The estimated time the UE may reach the Predicted/Expected UE location or EAS service area at the latest. This IE is used by EES as analytics input (e.g. when consuming ADAES service). |
| NOTE 1: This IE shall not be included when the request originates from the EEC.  NOTE 2: This IE shall be included if edge node sharing is used. | | |

Table 8.5.3.2-2: EAS discovery filters

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| List of AC characteristics (NOTE 1) | O | Describes the ACs for which a matching EAS is needed. |
| > AC profile (NOTE 2) | M | AC profile containing parameters used to determine matching EAS. AC profiles are further described in Table 8.2.2-1. |
| List of EAS characteristics (NOTE 1, NOTE 3) | O | Describes the characteristic of required EASs. |
| > EASID | O | Identifier of the required EAS. |
| > Bundle ID or list of EASID | O | A list of EASIDs or a bundle ID as described in clause 7.2.10. |
| > EAS provider identifier | O | Identifier of the required EAS provider |
| > EAS type | O | The category or type of required EAS (e.g. V2X) |
| > EAS schedule | O | Required availability schedule of the EAS (e.g. time windows) |
| > EAS Geographical Service Area | O | Location(s) (e.g. geographical area, route) where the EAS service should be available. |
| > EAS Topological Service Area | O | Topological area (e.g. cell ID, TAI) for which the EAS service should be available. See possible formats in Table 8.2.7-1. |
| > Service continuity support | O | Indicates if the service continuity support is required or not. |
| > Service permission level | O | Required level of service permissions e.g. trial, gold-class |
| > Service feature(s) | O | Required service features e.g. single vs. multi-player gaming service |
| NOTE 1: Either "List of AC characteristics" or "List of EAS characteristics" shall be present.  NOTE 2: "Preferred ECSP list" IE shall not be present.  NOTE 3: The "List of EAS characteristics" IE must include at least one optional IE, if used as an EAS discovery filter. | | |

\* \* \* Next Change \* \* \* \*

#### 8.5.3.4 EAS discovery subscription request

Table 8.5.3.4-1 describes the information elements for EAS discovery subscription request from the EEC to the EES.

Table 8.5.3.4-1: EAS discovery subscription request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| EECID | M | Unique identifier of the EEC. |
| UE Identifier | O | The identifier of the UE (i.e. GPSI or identity token) |
| Event ID | M | Event ID:  - EAS availability change  - EAS dynamic information change |
| Security credentials | M | Security credentials resulting from a successful authorization for the edge computing service. |
| Notification Target Address | O | The Notification target address (e.g. URL) where the notifications destined for the EEC should be sent to. |
| EAS discovery filters | O | Set of characteristics to determine matching EASs (as detailed in Table 8.5.3.2-2).  Applicable for "EAS availability change" event |
| EAS dynamic information filters | O | List of dynamic information changes (as detailed in Table 8.5.3.4-2) about EAS, the EEC is interested in.  Applicable for "EAS dynamic information change" event |
| EEC Service Continuity Support | O | Indicates if the EEC supports service continuity or not. The IE also indicates which ACR scenarios are supported by the EEC. |
| Proposed expiration time | O | Proposed expiration time for the subscription |
| EAS Instantiation Triggering Indication | O | Indicates to the EES that EAS instantiation triggering may be performed for the current request if needed. |
| Prediction expiration time | O | The estimated time the UE may reach the Predicted/Expected UE location or EAS service area at the latest. This IE is used by EES as analytics input (e.g. when consuming ADAES service).  Applicable for "EAS availability change" event. |
| Prediction request |  | Indicates to the EES that the EAS dynamic information change report may include prediction information.  Applicable for “EAS dynamic information change” event. |

Editor's note: Alignment of "EAS Instantiation Triggering Indication" IE with the EAS discovery request procedure is FFS.

Table 8.5.3.4-2: EAS dynamic information filters

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| List of dynamic information filters | M | List of EAS dynamic information required by the EEC per EAS. |
| > EASID | M | Identifier of the EAS |
| > ACIDs | O | Flag to notify change in list of ACIDs served by the EAS |
| > EAS Description | O | Flag to notify change in description of the EAS. |
| > EAS Endpoint | O | Flag to notify change in EAS endpoint. It may also include one or more EAS endpoints to be monitored by the EES. If no EAS endpoint is provided, all EASs registered in the EES will be monitored. |
| > EAS Features | O | Flag to notify any change in features provided by the EAS |
| > EAS Schedule | O | Flag to notify change in availability schedule of the EAS (e.g. time windows) |
| > EAS Service Area | O | Flag to notify change in change in geographical service area that the EAS serves |
| > EAS Service KPIs | O | Flag to notify change in characteristics of the EAS. |
| > EAS Status | O | Flag to notify change in the status of the EAS (e.g. enabled, disabled, etc.) |
| > Service continuity support | O | Flag to notify change in EAS support for service continuity. |

\* \* \* Next Change \* \* \* \*

#### 8.5.3.6 EAS discovery notification

Table 8.5.3.6-1 describes the information elements for EAS discovery notification from the EES to the EEC.

Table 8.5.3.6-1: EAS discovery notification

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Subscription ID | M | Subscription identifier corresponding to the subscription stored in the EES for the request |
| Event ID | M | Either EAS availability change or EAS dynamic information change |
| EAS list | O | List of discovered EAS profiles. Each element includes the information described below. |
| > EAS profile | M | Profile of the EAS. Each element is described in clause 8.2.4 |
| > Lifetime | O | Time interval or duration during which the information elements in the EAS profile is valid and supposed to be cached in the EEC (e.g. time-to-live value for an EAS Endpoint) |
| > Prediction information | O | Indicates the prediction confidence level (e.g. in percentage or "high/medium/low") for EAS service status (e.g. EAS schedule, EAS status) change and prediction validity time for such a change. |
| Instantiable EAS information | O | The EAS instantiation status per EASID (e.g. instantiated, instantiable but not be instantiated yet) |
| > Instantiation criteria (see NOTE) | O | The criteria upon which EAS can be instantiated (e.g. based on specific date and time). |
| NOTE: "Instantiation criteria" IE shall be present only when the value of "Instantiable EAS information" IE is "instantiable but not be instantiated yet". | | |

\* \* \* Next Change \* \* \* \*

#### 8.5.3.7 EAS discovery subscription update request

Table 8.5.3.7-1 describes the information elements for EAS discovery subscription update request from the EEC to the EES.

Table 8.5.3.7-1: EAS discovery subscription update request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Subscription ID | M | Subscription identifier corresponding to the subscription to be updated |
| Security credentials | M | Security credentials resulting from a successful authorization for the edge computing service. |
| Proposed expiration time | O | Proposed expiration time for the subscription |
| EAS discovery filters | O | Set of characteristics to determine required EASs, as detailed in Table 8.5.3.2-2. |
| EAS dynamic information filters | O | List of dynamic information about EAS, the EEC is interested in, as detailed in Table 8.5.3.4-2. |
| EEC Service Continuity Support | O | Indicates if the EEC supports service continuity or not. The IE also indicates which ACR scenarios are supported by the EEC. |
| Prediction expiration time | O | The estimated time the UE may reach the Predicted/Expected UE location or EAS service area at the latest. This IE is used by EES as analytics input (e.g. when consuming ADAES service).  Applicable for "EAS availability change" event. |

\* \* \* Next Change \* \* \* \*

#### 8.8.3.2 Discover T-EAS

Figure 8.8.3.2-1 illustrates the procedure for fetching T-EAS information. This procedure may be utilized by a S-EAS, which undertakes the transfer of application context information to a T-EAS directly, or can be invoked by the S-EES itself on deciding to execute ACR.

Pre-conditions:

1. Information related to the EES is available with the S-EAS, if the procedure is triggered by the S-EAS.



Figure 8.8.3.2-1: Discover T-EAS

1. The S-EAS sends the EAS discovery request to the S-EES or the S-EES decides to execute the ACR. The EAS discovery request from the S-EAS includes the requestor identifier [EASID] along with the security credentials and includes EAS discovery filter matching its EAS profile. If target DNAI is available at the S-EAS via User Plane Path change event, the S-EAS provides the S-EES with the target DNAI. The S-EAS also includes an EAS service continuity support indicator indicating that the S‑EAS decided ACR according to clause 8.8.2.4 is to be used for the ACR. The request may include prediction expiration time.

NOTE 1: The trigger condition to invoke the Discover T-EAS API is up to application service logic, which is out of scope of this specification.

2. If the request is received from the S-EAS, the S-EES checks whether the requesting EAS is authorized to perform the discovery operation. If the UE location is not known to the S-EES or provided by the S-EAS request, then the S-EES may interact with 3GPP core network to retrieve the UE location. If the S-EES decided to execute the ACR or when the requesting EAS is authorized, the S-EES checks if there exists a T-EAS information (registered or cached) that can satisfy the requesting EAS information, additional query filters and the Expected AC Service KPIs and the Minimum required AC Service KPIs if received from the EEC during the EAS discovery or from the S-EAS in step 1. If the S-EES finds the T-EAS(s) in the cached or registered information, the flow either continues with step 5 for the S-EAS triggered discovery or stops for the S-EES decided ACR execution, else the S-EES retrieves the T-EES address from the ECS as specified in clause 8.8.3.3 and continues with step 3.

3. The S-EES invokes the EAS discovery request on the T-EES retrieved from the ECS. The EAS discovery request includes the requestor identifier [EESID] along with the security credentials and includes EAS discovery filter. In the EAS discovery filter, the S-EES may include prediction expiration time, the Expected AC Service KPIs and the Minimum required AC Service KPIs if received from the EEC during the EAS discovery or from the S-EAS in step 1.

The S-EES also includes the EEC service continuity support indicator received from the EEC during EAS discovery. If in step 1 the S-EES received an EAS service continuity support indicator from the S-EAS, then the S-EES includes this EAS service continuity support indicator and its own EES service continuity support indicator indicating the ACR scenarios supported by the EES. If in step 1 the S-EES decided to execute the ACR, the S-EES includes the EAS service continuity support indicator received from the S-EAS during EAS registration and includes an EES service continuity support indicator indicating that the S‑EES executed ACR according to clause 8.8.2.5 is to be used for the ACR.

Upon receiving the request, the T-EES may trigger the EAS management system to instantiate the T-EAS that matches with EAS discovery filter IEs (e.g. ACID) as in clause 8.12.

4. The T-EES discovers the T-EAS(s) and responds with the discovered T-EAS information to the S-EES. To filter T-EAS(s), the T-EES utilizes the discovery filters (e.g. Expected AC Service KPIs and the Minimum required AC Service KPIs) and the indications which ACR scenarios are supported by the AC, the EEC, the S-EES and the S-EAS. If T-EES gets the Expected AC service KPIs or the Minimum required AC Service KPIs, the T-EES may collect Edge load performances from ADAES or OAM to find T-EAS(s) that satisfies the Expected AC service KPIs or the Minimum required AC Service KPIs. The S-EES may cache the T-EAS information.

NOTE 2: The Edge load performance can be either statistics or prediction.

Editor's Note: The EES uses local policies to determine the use of statistics or prediction for evaluating KPIs. It is FFS whether the EES may also use request information to make this determination.

5. If the request was received from the S-EAS, the S-EES responds to the S-EAS with the discovered T-EAS Information.

\* \* \* END of Change \* \* \* \*