**3GPP TSG-S4 Meeting # 127-bis-e *S4-240579***

Online, April 8th - 12th, 2024 revsion of S4-240505

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| *CR-Form-v12.2* |
| **PSEUDO CHANGE REQUEST** |
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|  | **26.510** | **CR** |  | **rev** | **24** | **Current version:** | **1.1.4** |  |
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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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | pCR on Background Data Transfer in 5G Media |
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| ***Source to WG:*** | Qualcomm Inc., Tencent Cloud, BBC |
| ***Source to TSG:*** | S4 |
|  |  |
| ***Work item code:*** | 5GMS\_Pro\_Ph2 |  | ***Date:*** | 23-01-2024 |
|  |  |  |  |  |
| ***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 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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | The usage of Background Data Transfer (BDT) in 5GMS has been studied in TR26.804. This CR introduces the feature of BDT into 5G Media, to enable application providers to provision its usage and clients to benefit from it. |
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| ***Summary of change:*** | The change adds the capability to provision BDT in the M1 procedures, inform the MSH about the availability of BDT, and enable applications to make use of it over the M6 interface. |
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| ***Consequences if not approved:*** | BDT will not be supported in 5G Media. |
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| ***Clauses affected:*** | 2, 5.2.7.1, 5.2.7.3, 5.3.3.2, 8.7.3.1, 9.3.3.1, 10.3.1.1, 10.3.4 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | S4-240067, S4-240133, S4-240372, S4-240505 |

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| **1st Change** |

# 2 References

[29554] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

[29514] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[29122] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[29519] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository Service for Policy Data, Application Data and Structured Data for Exposure; Stage 3".

[29522] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

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| **2nd Change** |

#### 5.2.7.1 General

These operations are used by the Media Application Provider to configure Policy Templates for the media delivery sessions of a particular Provisioning Session.

A Policy Template, identified by its policyTemplateId, represents a set of PCF/NEF API parameters which defines the service quality and/or associated charging for the corresponding media delivery session(s). The Policy Template is configured as part of the provisioning procedures with the Media AF using the API specified in clause 8.7 and is subsequently instantiated by a Media Session Handler using the interactions specified in clause 5.4.3. At this point, the parameters in the Policy Template are used by the Media AF to request specific QoS and/or charging policies from the PCF (either directly or via the NEF, as specified in clause 5.5.2) for that Media Delivery session.

When a Policy Template is intended to influence the network QoS of Service Data Flows used for media delivery, the qoSSpecification object (of type M1QoSSpecification) shall be present:

- The qosReference value, as specified in clause 5.6.2.7 of TS 29.514 [29514], is obtained with the Service Level Agreement. See TS 23.502 [23502] for detailed usage.

- The maxBtrUl and maxBtrDl properties define the maximal bit rates which are permitted to be requested by a Media Session Handler on (respectively) uplink and downlink Service Data Flows. These values are defined by configuration of the 5G System and are therefore populated by the Media AF rather than by the Media Application Provider.

- The maxAuthBtrUl and maxAuthBtrDl properties define the maximal authorized bit rate values which are permitted to be requested by a Media Session Handler on (respectively) uplink and downlink Service Data Flows. Higher bit rate values are not authorized for use by the 5GMS Application Provider.

- The minPacketLossRateDl and minPacketLossRateUl properties define the minimal packet loss rates which are permitted to be requested by a Media Session Handler on (respectively) uplink and downlink Service Data Flows.

When a Policy Template is intended to be used for Background Data Transfer, the properties of a new Background Data Transfer policy are specified by the Media Application Provider in the bdtSpecification property (of type M1BDTSpecification).

- The startDate and endDate indicate the time interval for the Background Data Transfer policy.

- The *enforceAggregateBitrate* indicates the request by the Media Application Provider to enforce the maximum aggregate UL/DL bitrates as allocated for the BDT policy, to be applied to all sessions that instantiate the policy template. If set to false, the Media AF will have flexibility to instantiate the BDT policy, even if the maximum aggregate UL/DL bitrates is exceeded, which might incur extra cost to the Media Application Provider.

- The windows property indicates the desired time windows over which the Background Data Transfer may occur.

- The numberOfUes property indicates the maximum number of UEs permitted to instantiate the Policy Template and make use of Background Data Transfers during a single window instance.

- The *avgVol*PerUe that reflects the average data volume that each UE is expected to transfer during a single window instance.

When a Policy Template is intended to be used for differential charging, the chargingSpecification property shall be present:

- applicationSessionContext is an optional child object.

- The dnn property contains the name of the Data Network in which the Media AF is hosted.

- When Network Slicing is used, the sliceInfo property contains information about the network slice which is serving the UE.

HTTP responses for successful and operation-specific failure cases are specified in the following clauses. For all other failure cases, an HTTP response indicating a response code in accordance with clause 7.1.6 shall be returned to the API client. In all failure cases a message body in accordance with clause 7.1.7 shall be included in the response message.

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| **3rd Change** |

#### 5.2.7.3 Create Policy Template resource operation

This operation is used by the Media Application Provider to create a new Policy Template resource. The HTTP POST method shall be used for this purpose. The request URL shall be a well-known sub-resource of the Provisioning Session resource representing its Policy Templates resource collection, as specified in clause 8.7.2. The HTTP request message body shall be a Policy Template resource representation, as specified in clause 8.7.3.1.

If the Policy Template includes the bdtSpecification property, the Media AF shall attempt to create a series of new Background Data Transfer policies in the PCF using the procedure specified in clause 5.5.1A. The individual Background Data Transfer policy associated with each time window shall be created prior to the start of that time window.

If the procedure is successful, the Media AF shall generate a resource identifier to uniquely identify the newly created Policy Template resource. In that case, it shall return a 201 (Created) HTTP response message and the URL of the newly created resource, including its resource identifier, shall be provided as the value of the Location HTTP header field. The response message body shall be a representation of the current state of the Policy Template resource (see clause 8.7.3.1), including any property values set by the Media AF.

If the request is acceptable but the Media AF is unable to provision the resources required by the supplied Policy Template (for example if it fails to create a new Background Data Transfer policy), the create operation shall fail with an HTTP response status code of 500 (Internal Server Error) and an error message body per clause 7.1.7. In this case, the Edge Resources Configuration resource shall remain in an uncreated state in the Media AF.

This operation may be performed multiple times by a Media Application Provider to provision different Policy Template resources within the scope of a Provisioning Session. Each such resource is assigned a different Policy Template identifier by the Media AF.

The default state of a newly created Policy Template resource is PENDING. If all mandatory property values have been provided, the Policy Template resource is eligible for validation, as specified in clause 5.2.7.2.

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| **4th Change** |

#### 5.3.3.2 Create Dynamic Policy Instance resource operation

In order to instantiate a new dynamic policy, the Media Session Handler shall first create a resource for the Dynamic Policy Instance in the Media AF. The Media Session Handler shall use the HTTP POST message for this purpose. The body of the HTTP POST message shall be a Dynamic Policy Instance resource representation that includes a Provisioning Session identifier, the resource identifier of the target Policy Template and a set of Service Data Flow descriptions identifying the application flow(s) to be policed.

1. The provisioningSessionId property associates the Dynamic Policy Instance resource with a Provisioning Session.

2. The policyTemplateId property uniquely identifies the Policy Template on which the Dynamic Policy Instance is based.

3. The serviceDataFlowDescriptions property of the Dynamic Policy Instance resource representation is populated by the Media Session Handler and shall declare a set of Service Data Flow templates according to TS 23.503 [23503] that describe one or more application data flows comprising the media delivery session. Each Service Data Flow template contains exactly one of the following filtering specifications to identify traffic belonging to a media delivery application flow:

- a flowDescription object (including 5-tuples, Type of Service, Security Parameter Index, etc.).

- a domainName.

4. When the Media Session Handler attempts to activate a QoS-related Policy Template, the qosSpecification property shall be present in the Dynamic Policy Instance resource representation and it shall contain the following properties:

- marBwDlBitRate or marBwUlBitRate, indicating the maximum requested bit rate by the Media Session Handler.

- mirBwDlBitRate or mirBwUlBitRate, indicating the minimum requested bit rate by the Media Session Handler.

- minDesBwDlBitRate or minDesBwUlBitrate, indicating the minimum bit rate desired by the Media Session Handler.

5. When the Media Session Handler instantiates a Policy Template that is provisioned with a Background Data Transfer (BDT) specification per clause 5.2.7.1, the bdtSpecification property shall be present and it shall contain the following properties:

- estimatedDataTransferVolume, indicating the data volume that the Media Client estimates it will use during the current BDT time window.

- The windows property indicates time windows over which Background Data Transfers are offered to the Media Session Handler.

- The maximimumDownlinkBitRate and maximimumUplinkBitRate properties indicate the maximum permitted bit rate for Background Data Transfers in the downlink and uplink directions respectively when the dynamic policy is in force.

6. When the 5G System employs a traffic enforcement function to ensure that traffic complies with the policy described by the qosSpecification property, the Media AF shall explicitly indicate this in the Dynamic Policy resource representation by setting the qosEnforcement property to true.

If the operation is successful, the Media AF shall create a new Dynamic Policy Instance resource. In this case, the Media AF shall return a 201 (Created) HTTP response message to the Media Session Handler, and the URL of the newly created Dynamic Policy Instance resource, including its resource identifier, shall be provided as the value of the Location HTTP header field. The response message body shall be a representation of the current state of the Dynamic Policy Instance resource (see clause 9.3.3.1), including any properties assigned by the Media AF.

When the Dynamic Policy Instance is successfully instantiated, the Media AF triggers the creation of a corresponding PCC rule in the 5G System according to clause 5.5.2 to enforce the required QoS and/or charging policy on the specified application flow(s). Depending on the ServiceDataFlowDescription objects in the received Dynamic Policy Instance resource representation and the sdfMethod indicated by each one, the Media AF shall populate for each one a flowDescription object and/or provide an Application Identifier referring to a PFD (Packet Flow Description) object containing the domain name of a Media AS instance.

NOTE: When the Media AF is deployed in an external Data Network, it is the responsibility of the NEF to map any external Application Identifier supplied by the Media AF into an internal Application Identifier that is known to the PCF.

If the supplied Dynamic Policy Instance is not acceptable to the Media AF, the create operation shall fail with an HTTP response status code of 400 (Bad Request) and an error message body per clause 7.1.7. In this case, the Dynamic Policy Instance resource shall remain in an uncreated state in the Media AF.

If the request is acceptable but the Media AF forbids the instantiation of the referenced Policy Template, for example because the quota for Background Data Transfers has been exceeded or because the UE is not permitted in the charging specification, the update operation shall fail with an HTTP response status code of 403 (Forbidden) and an error message body per clause 7.1.7. In this case, the Dynamic Policy Instance resource shall remain in an uncreated state in the Media AF.

If the request is acceptable but the Media AF is unable to provision the resources required by the supplied Dynamic Policy Instance, the create operation shall fail with an HTTP response status code of 500 (Internal Server Error) and an error message body per clause 7.1.7. In this case, the Dynamic Policy Instance resource shall remain in an uncreated state in the Media AF.

If the Media Session Handler needs to instantiate several dynamic policies, it may invoke this operation as often as needed.

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| **5th Change** |

### 5.5.1A Policy control interactions for Policy Template provisioning

When a Policy Template is provisioned that specifies a new Background Data Transfer policy by including the bdtSpecification property, the Media AF shall invoke the Npcf\_‌BDT‌Policy‌Control\_‌Create operation as specified in clause 4.2.2 of TS 29.554 [29554] to create a new Background Data Transfer policy in the PCF.

When a Policy Template that specifies a Background Data Transfer policy by including the bdtSpecification property is destroyed, there is no operation specified by the Npcf\_‌BDT‌Policy‌Control service in TS 29.554 [29554] to destroy the corresponding Background Data Transfer policy in the PCF.

The Media AF is responsible for allocating the UL/DL bitrates when a BDT policy is activated, in a way so that the aggregate maximum UL/DL bitrates are not exceeded at any point of time. How the media AF achieves this limit is out of scope of this specification. The Media AF may use the avgVolPerUe and the numOfUes to estimate the total aggregate volume per window.

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| **6th Change** |

### 5.5.2 Policy control interactions for Dynamic Policies

The Dynamic Policies feature operates at reference point M5 between the Media Session Handler in the Media Client and a Media AF that has been appropriately provisioned with Policy Templates (see clause 5.2.7). The Dynamic Policy API at reference point M5 (see clauses 5.3.3 and 9.3) is specified in a generic way such that the associated functionality in the 5GC may be realised by various means.

NOTE 1: This clause does not limit the possible set of 5G System exposure functionalities for realising dynamic policies.

In this release, the Media AF converts Dynamic Policies API invocations received at reference point M5 into direct or indirect invocations of the Policy Authorization Service exposed by the PCF, and converts responses from the PCF into their equivalents at reference point M5 for return to the Media Session Handler.

To realise dynamic policies, the Media AF shall interact with the PCF using one of the following methods:

A. If the Media AF is deployed in the Trusted DN, it may directly invoke the Npcf\_Policy‌Authorization service at reference point N5, as specified in TS 29.514 [29514].

NOTE 2: It is the responsibility of the Media AF in this case to discover and track changes to the PCF instance responsible for the PDU Session supporting the media streaming session at reference point M4 using the discovery services provided by the NRF and/or BSF.

B. If the Media AF is deployed outside the Trusted DN, or if it is more convenient for a Media AF deployed in the Trusted DN to do so, it invokes the Nnef\_AFSession‌With‌QoS and/or Nnef\_Chargeable‌Party services exposed by the NEF, as specified in clauses 4.4.9 and 4.4.8 respectively of TS 29.522 [29522], to indirectly invoke the PCF at reference point N33.

NOTE 3: Per clause 4.4.9 of TS 29.522 [29522], the Nnef\_AFSession‌With‌QoS service is realised at reference point N33 by the AsSession‌With‌QoS exposure API. Similarly, the Nnef\_Chargeable‌Party service is realised by the Chargeable‌Party exposure API per clause 4.4.8 of [29522].

NOTE 4: Configuration of the NEF endpoint address and access credentials in the Media AF in this case is beyond the scope of the present document.

When a dynamic policy is instantiated by the Media Session Handler (per clause 4.7.3), the Media AF shall create an *AF application session context* in the PCF responsible for the PDU Session corresponding to the M4 application flows listed in the DynamicPolicy.‌serviceDataFlow‌Descriptions property.

If no corresponding AF application session context already exists, the Media AF shall use the Npcf\_‌Policy‌Authorization\_‌Create operation at reference point N5 (or, if deployed outside the Trusted DN, the equivalent AsSession‌WithQoS service operation) with the appropriate service information to create and provision a new AF application session context. The information in the AppSessionContext‌ReqData shall be derived from the service data flow descriptions in the dynamic policy resource and/or the requested QoS.

The AF application session context shall declare exactly one media component per media streaming session. A separate sub-component shall be declared for each M4 application flow listed in the NetworkAssistanceSession.‌serviceDataFlow‌Descriptions array.

For each of the dynamic policies it is managing, the Media AF shall subscribe to the following PCF notifications on the corresponding AF application session context:

- Service Data Flow QoS notification control;

- Service Data Flow deactivation;

- Resources allocation outcome.

When requesting QoS provisioning for a media streaming session, the Media AF shall use the configured Policy Template of the dynamic policy to determine the list of the QoS references within altSerReqs. The lowest priority index shall be assigned to the policy template with the lowest QoS requirement, and the highest priority shall be assigned to the requested operation point by the UE (if the UE is allowed to use that operation point).

When instantiating a Policy Template that has a Background Data Transfer policy, the Media AF needs to populate some of the properties in the M5BDTSpecification object specified in clause 9.3.3.2 for inclusion in the Dynamic Policy Instance resource returned to the Media Session Handler at reference point M5.

Where the Policy Template references an existing Background Data Transfer policy by including the bdtPolicyId property, in order to populate the properties of the M5BDTSpecification object the Media AF shall first retrieve the individual Background Data Transfer policy resource referenced by bdtPolicyId from the PCF. The Npcf\_‌BDT‌Policy‌Control service operation specified in clause 5.3.3.3.1 of TS 29.554 [29554] shall be used for this purpose.

When a dynamic policy is subsequently destroyed by the Media Session Handler (per clause 4.7.3), the Media AF shall destroy the corresponding AF application session context in the relevant PCF instance.

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| **7th Change** |

#### 8.7.3.1 PolicyTemplate resource

Table 8.7.3.1-1: Definition of PolicyTemplate resource

| Property | Type | Cardinality | Usage | Description |
| --- | --- | --- | --- | --- |
| policyTemplateId | ResourceId | 1..1 | C: ROR: ROU: RO | Resource identifier of this Policy Template assigned by the Media AF that is unique within the scope of the Provisioning Session. |
| state | string enum | 1..1 | C: ROR: ROU: RO | Current state of this Policy Template (see clause 5.2.7.2) exposed to the 5GMS Application Provider by the Media AF.Only a Policy Template in the READY state may be instantiated as a Dynamic Policy Instance and applied to media streaming sessions. |
| stateReason | Problem‌Details | 1..1 | C: ROR: ROU: RO | Additional details about the current state of this Policy Template exposed to the Media Application Provider by the Media AF.The instance sub-property shall be present and shall indicate the URL of this Policy Template resource at reference point M1.The title sub-property shall be present and shall indicate a human-readable representation of the state property specified above, e.g., "Policy Template ready for use" or "Policy Template invalid".The detail sub-property shall be present and shall indicate a human-readable status/error message.All other properties shall be omitted. |
| externalReference | string | 1..1 | C: RWR: RWU: RW | Additional identifier for this Policy Template, unique within the scope of its Provisioning Session, that may be cross-referenced with external metadata about a media delivery session.Example: "HD\_Premium". |
| application‌Session‌Contexts | array(object) | 0..1 | C: RWR: RWU: RW | Exactly one application session context at reference point M4 to which this Policy Template may be applied.Each object in the array shall specify at least one property. If more than one property is specified, instantiation of the Policy Template is restricted to the conjunction of all the object's properties. |
|  | sliceInfo | Snssai | 0..1 | C: RWR: RWU: RW | A Network Slice on which this Policy Template may be instantiated. See clause 5.4.4.2 of TS 29.571 [29571]. |
|  | dnn | Dnn | 0..1 | C: RWR: RWU: RW | A Data Network on which this Policy Template may be instantiated. (See clause 7.3.2.) |
| qoSSpecification | M1‌QoS‌Specification | 0..1 | C: RWR: RWU: RW | The network Quality of Service policy to be applied to media delivery sessions that instantiate this Policy Template (see NOTE 1 and clause 7.3.3.3). |
| charging‌Specification | Charging‌Specification | 0..1 | C: RWR: RWU: RW  | The charging policy to be applied to media delivery sessions that instantiate this Policy Template is instantiated (see NOTE 1). |
| bdtPolicyId | BdtReferenceId | 0..1 | C: RWR: ROU: RW | A reference to an existing Background Data Transfer policy in the PCF (see NOTE 2).Mutually exclusive with bdtSpecification. |
| bdtSpecification | M1‌BDT‌Specification | 0..1 | C: RWR: ROU: RW | The Background Data Transfer policy specification to be associated with media delivery sessions that instantiate this Policy Template (see clause 8.7.3.2).Mutually exclusive with bdtPolicyId property. |
| NOTE 1: At least one of qoSSpecification and charging‌Specification shall be present.NOTE 2: Data type BdtReferenceId is specified in TS 29.122 [29122]. |

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| **8th Change** |

#### 8.7.3.2 M1BDTSpecification type

Table 8.7.3.2-1: Definition of M1BDTSpecification type

| Property name | Type | Cardinality | Description |
| --- | --- | --- | --- |
| startDate | DateTime | 0..1 | The start date of the Background Data Transfer policy.The time data part of this value shall not be present. |
| endDate | DateTime | 0..1 | The last date of the Background Data Transfer policy.The time data part of this value shall not be present. |
| enforceAggregateBitrate | boolean | 0..1 | If set to True, the Media AF will ensure that the aggregate bitrate quotas configured for the BDT policy are not exceeded at any time by all Media Clients for which the BDT policy is active, to avoid e.g. incurring extra cost. The default value is True. |
| windows | array(object) | 1..1 | The windows when Background Data Transfers are permitted.The array shall contain at least one window specification. |
|  | startTime | TimeOfDay | 0..1 | The starting time of a Background Data Transfer window. |
|  | duration | DurationMin | 0..1 | The duration of the Background Data Transfer window in minutes with the maximum value of 1339.The duration may result in a window ending on the next calendar day. |
|  | daysInWeek | array(DayOfWeek) | 0..1 | The days of the week that the Background Data Transfer window is in effect.A maximum of seven occurrences can be provided. No two occurrences of array shall have the same value.If omitted, the Background Data Transfer window is applicable on all days of the week. |
|  | numberOfOccurrences | integer | 0..1 | The number of days that the Background Data Transfer window is in effect. Each daysInWeek reccurrence is counted as one occurrence.The Background Data Transfer specification ends when either the endDate or the numberofOccurrences is reached, whichever sooner. |
|  | numberOfUes | integer | 0..1 | The maximum number of UEs permitted to use the Background Data Transfer policy in each occurrence of the Background Data Transfer window.Minimum value: 1. |
|  | avgVolPerUe | UsageThreshold | 0..1 | The estimated average data volume each UE is expected to transfer (in both the downlink and uplink directions) when applying this Background Data Transfer policy in each occurrence of the Background Data Transfer window (see NOTE 2). |
| NOTE 1: Data types TimeOfDay, DurationMin and DayOfWeek are defined in TS 29.122[29122].NOTE 2: Data type UsageThreshold are defined in TS 29.122 [29122]. |

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| **9th Change** |

#### 9.2.3.1 ServiceAccessInformation resource type

The data model for the ServiceAccessInformation resource is specified in table 9.2.3.1-1 below. Different properties are present in the resource depending on the type of Provisioning Session from which the Service Access Information is derived (as indicated in the provisioningSessionType property) and this is specified in the *Applicability* column.

Table 9.2.3.1‑1: Definition of ServiceAccessInformation resource

| Property name | Type | Cardinality | Usage | Description | Applicability |
| --- | --- | --- | --- | --- | --- |
| provisioningSessionId | ResourceId | 1..1 | RO | Unique identification of the M1 Provisioning Session. | All types |
| provisioningSession‌Type | Provisioning‌Session‌Type | 1..1 | RO | The type of Provisioning Session. | All types. |
| streamingAccess | object | 0..1 | RO | Present if Content Hosting or Content Publishing is provisioned in the parent Provisioning Session. | MS\_DOWNLINK,MS\_UPLINK |
|  | entryPoints | Array(M5‌Media‌Entry‌Point) | 0..1 | RO | A list of alternative Media Entry Points for the Media Client to choose between. |
|  |  | locator | AbsoluteUrl | 1..1 | RO | Populated from information in the Content Hosting Configuration or Content Publishing Configuration as specified in clause 8 of TS 26.512 [26512].For downlink media streaming, either a pointer to a document at reference point M4 that defines a media presentation (e.g. a DASH MPD) whose resources are mapped to a content ingest configuration at reference point M2, or else the URL of a single media resource (e.g. an MP4 asset) available for download at reference point M4 that is mapped to reference point M2 by a Content Publishing Configuration.For uplink media streaming, either a pointer to a document at reference point M4 that defines a media presentation (e.g. a DASH MPD) whose resources are mapped to an egest configuration at reference point M2, or else the URL of a path at reference point M4 the subresources of which are mapped to reference point M2 by a Content Publishing Configuration. In the latter case, the combination of contentType and profiles shall determine the semantics of the Media Entry Point locator. |
|  |  | contentType | string | 1..1 | RO | The MIME content type of resource at locator. |  |
|  |  | profiles | array(Uri) | 0..1 | RO | An optional list of conformance profile URIs with which this Media Entry Point is compliant.If present, the array shall contain at least one item. |  |
|  | eMBMS‌Service‌Announcement‌Locator | AbsoluteUrl | 0..1 | RO | A pointer to an eMBMS User Service Announcement document. |  |
|  | mbs‌External‌Service‌Identifier | string | 0..1 | RO | The external service identifier of an MBS User Service. |  |
| clientConsumptionReporting‌Configuration | object | 0..1 | RO | Present if consumption reporting is activated for this Provisioning Session. | MS\_DOWNLINK |
|  |  | reportingInterval | DurationSec | 0..1 | RO | The time interval, expressed in seconds, between consumption report messages being sent by the Media Session Handler. The value shall be greater than zero.When this property is omitted, a single final report shall be sent immediately after the media streaming session has ended. |
|  |  | serverAddresses | array(AbsoluteUrl) | 1..1 | RO | A list of Media AF addresses (URLs) where the consumption reporting messages are sent by the Media Session Handler. (See NOTE 1).Each address shall be an opaque base URL, following the format specified in clause 7.1.3 up to and including the {apiVersion} path element. |
|  |  | locationReporting | boolean | 1..1 | RO | Indicates whether the Media Session Handler is required to provide location data in consumption reporting messages (in case of MNO or trusted third parties).Shall be set false if the locationReporting parameter is omitted from the Consumption‌Reporting‌Configuration, as specified in table 8.11.3.1‑1. |
|  |  | accessReporting | boolean | 1..1 | RO | Indicates whether the Media Session Handler is required to supply consumption reporting units whenever the access network changes during a media delivery session.Shall be set false if the accessReporting parameter is omitted from the Consumption‌Reporting‌Configuration, as specified in table 8.11.3.1‑1. |
|  |  | samplePercentage | Percentage | 1..1 | RO | The percentage of media delivery sessions that shall send consumption reports, expressed as a floating-point value between 0.0 and 100.0.Shall be set to 100.0 if the samplePercentage parameter is omitted from the Consumption‌Reporting‌Configuration, as specified in table 8.11.3.1‑1. |
| dynamicPolicyInvocation‌Configuration | object | 0..1 | RO | Present if Policy Templates have been provisioned in the parent Provisioning Session and at least one of them is in the READY state. | MS\_DOWNLINK,MS\_UPLINK |
|  | serverAddresses | array(AbsoluteUrl) | 1..1 | RO | A list of Media AF addresses (URLs) which offer the APIs for dynamic policy invocation sent by the Media Session Handler. (See NOTE 1.)Each address shall be an opaque base URL, following the format specified in clause 7.1.3 up to and including the {apiVersion} path element. |  |
|  | policyTemplateBindings | array(object) | 1..1 | RO | A list of duples, each one binding an external reference to a Policy Template resource identifier. |  |
|  |  | externalReference | string | 1..1 | RO | Additional identifier for this Policy Template, unique within the scope of its Provisioning Session, that can be cross-referenced with external metadata about the media streaming session.Example: "HD\_Premium". |  |
|  |  | policyTemplateId | ResourceId | 1..1 | RO | The resource identifier of a Policy Template tagged with externalReference that is in the READY state. |  |
|  | sdfMethods | array(SdfMethod) | 1..1 | RO | A list of Service Data Flow description methods, e.g. 5-tuple, ToS, 2-tuple, etc., which should be used by the Media Session Handler to describe the Service Data flows at reference point M2 for media delivery sessions. |  |
|  | bdtWindows | Array(BDTWindow) | 0..1 | RO | A list of BDT time windows, during which the application may request the activation of a BDT policy associated with this dynamic policy. The actual usage quotas for data volume and bitrate are determined upon activation of the BDT policy for a specific window. BDTWindow is defined in clause 9.3.3.2. |  |
| clientMetricsReporting‌Configurations | array(object) | 0..1 | RO | Present if QoE metrics reporting is provisioned in the parent Provisioning Session.If present, contains one or more client metrics reporting configurations. | MS\_DOWNLINK,MS\_UPLINK |
|  | metricsReporting‌ConfigurationId | ResourceId | 1..1 | RO | The identifier of this metrics reporting configuration, unique within the scope of the parent Provisioning Session.The value shall be the same as the corresponding identifier provisioned at reference point M1 (see clause 8.10.3.1). |
|  | serverAddresses | array(AbsoluteUrl) | 1..1 | RO | A list of Media AF addresses to which metrics reports shall be sent. (See NOTE 1).Each address shall be an opaque base URL, following the format specified in clause 7.1.3 up to and including the {apiVersion} path element. |
|  | *sliceScope* | array(Snssai) | 0..1 | RO | The set of network slice(s) for which metrics collection and reporting shall be executed in connection with this metrics reporting configuration (see NOTE 2).If present, the array shall identify at least one network slice.If absent, metrics shall be collected and reported for media delivery sessions within the scope of the parent Provisioning Session regardless of network slice. |
|  | scheme | Uri | 1..1 | RO | A URI identifying the metrics scheme that metrics reports shall use (see clause 5.2.10). |
|  | dataNetworkName | Dnn | 0..1 | RO | The name of the Data Network which shall be used to send metrics reports.If not specified, the default DN shall be used. |
|  | *reportingStartOffset* | DurationSec | 0..1 | RO | The time offset (expressed in seconds) from the start of a media delivery session when the Media Client is required to begin submitting metrics reports.If omitted, the value of this parameter is assumed to be zero, i.e., directing the Media Client to start reporting metrics from the start of the media delivery session. |
|  | *reportingDuration* | DurationSec | 0..1 | RO | The period of time (expressed in seconds) measured relative to the reporting start point, after which the Media Client is required to stop reporting metrics.If omitted, reporting is required to continue until the end of the media delivery session. |
|  | reportingInterval | DurationSec | 0..1 | RO | The time interval, expressed in seconds, between metrics reports being sent by the Media Session Handler. The value shall be greater than zero.When this property is omitted, a single final report shall be sent immediately after the media streaming session has ended. |
|  | samplePercentage | Percentage | 1..1 | RO | The percentage of media delivery sessions that shall report QoE metrics, expressed as a floating-point value between 0.0 and 100.0. |
|  | urlFilters | array(string) | 0..1 | RO | A non-empty list of Media Entry Point URL patterns for which QoE metrics shall be reported. The format of each pattern shall be a regular expression as specified in [ECMA262].If not specified, reporting shall be done for all media delivery sessions. |
|  | samplingPeriod | DurationSec | 1..1 | RO | The time interval the Media Client should wait between sampling the QoE metrics specified by this metrics reporting configuration. |
|  | metrics | array(string) | 1..1 | RO | A list of QoE metrics which shall be reported.If empty, the complete (or default if applicable) set of metrics associated with the specified scheme shall be collected and reported. |
| networkAssistance‌Configuration | object | 0..1 | RO | Present if Network Assistance is provisioned in the parent Provisioning Session. | MS\_DOWNLINK,MS\_UPLINK |
|  | serverAddresses | array(AbsoluteUrl) | 1..1 | RO | A list of Media AF addresses (URLs) that offer the APIs for AF-based Network Assistance at reference point M5. (See NOTE 1.)Each address shall be an opaque URL, following the format specified in clause 7.1.3 up to and including the {apiVersion} path element. |
| client‌EdgeResources‌Configuration | object | 0..1 | RO | Present only for Provisioning Sessions with client-driven edge computing management mode provisioned. | MS\_DOWNLINK,MS\_UPLINK |
|  | eligibilityCriteria | Edge‌Processing‌Eligibility‌Criteria | 0..1 | RO | Conditions for activating edge resources for media delivery sessions in the scope of the parent Provisioning Session. (See clause 7.3.3.10.) |
|  | easDiscoveryTemplate | EAS‌Discovery‌Template | 1..1 | RO | A template for the EAS discovery filter that shall be used by the EEC to discover and select a Media EAS instance to serve media delivery sessions at reference point M4 in the scope of the parent Provisioning Session. (See clause 9.2.3.2.) |
|  | easRelocation‌Requirements | M5EAS‌Relocation‌Requirements | 0..1 | RO | EAS relocation tolerance and requirements.If absent, the EEC shall assume that relocation is tolerated by all Media EAS instances in the scope of the parent Provisioning Session. (See clause 9.2.3.3.) |
| NOTE 1: In deployments where multiple instances of the Media AF expose the Media Session Handling APIs at reference point M5, the 5G System may use a suitable mechanism (e.g., HTTP load balancing or DNS-based host name resolution) to direct requests to a suitable Media AF instance.NOTE 2: The Snssai data type is specified in TS 29.571 [29571]. |

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| **10th Change** |

#### 9.3.3.1 DynamicPolicy resource

Table 9.3.3.1-1: Definition of Dynamic Policy Instance resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| dynamicPolicyId | ResourceId | 1..1 | RO | Unique identifier for this Dynamic Policy assigned by the Media AF. |
| provisioningSessionId | ResourceId | 1..1 | C: RWR: ROU: RW | Provisioning Session identifier obtained from Service Access Information (see clause 11.2.3).Uniquely identifies a Provisioning Session, which is linked to the Application Service Provider. |
| policyTemplateId | ResourceId | 1..1 | C: RWR: ROU: RW | Identifies the Policy Template to be applied to the application flow(s). |
| serviceDataFlowDescriptions | array(Service‌Data‌Flow‌Description) | 1..1 | C: RWR: ROU: RW | Describes the Service Data Flows managed by this Dynamic Policy. |
| mediaType | MediaType | 0..1 | C: RWR: ROU: RW | The type of media carried by the application flows listed in service‌DataFlow‌Descriptions. |
| qosSpecification | M5‌QoS‌Specification | 0..1 | C: RWR: ROU: RW | The network Quality of Service requirements of this Dynamic Policy (see clause 7.3.3.4). |
| bdtSpecification | M5‌BDT‌Specification | 0..1 | C: RWR: ROU: RW | The Background Data Transfer time windows and traffic limits that apply to this Dynamic Policy. |
| qosEnforcement | Boolean | 1..1 | C: ROR: ROU: RO | Indication that the Quality of Service described in qosSpecification is being enforced by the 5G System. |

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| **11th Change** |

#### 9.3.3.2 BDTWindow type

Table 9.3.3.2-1: Definition of BDTWindow type

|  |  |  |  |
| --- | --- | --- | --- |
| windows | array(object) | 1..1 | Windows when Background Data Transfers are requested/permitted.The array shall contain at least one window specification. |
|  | timeWindow | TimeWindow | 1..1 | The absolute start date‑time and stop date‑time of the Background Data Transfer window (see NOTE 2). |
|  | maximumDownlink‌BitRate | BitRate | 0..1 | The maximum bit rate that the UE is authorised/requested to use in the downlink direction during timeWindow. |
|  | maximumUplink‌BitRate | BitRate | 0..1 | The maximum bit rate that the UE is authorised/requested to use in the uplink direction during timeWindow. |
| NOTE 1: Data types TimeWindow is defined in TS 29.122 [29122]. |

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| **10th Change** |

#### 9.3.3.3 M5BDTSpecification type

| Property name | Type | Cardinality | Description |
| --- | --- | --- | --- |
| estimated‌Data‌Transfer‌Volume | UsageThreshold | 0..1 | The data traffic that the UE expects to use during the current time window (see NOTE 1).Value provided by the Media Session Handler to the Media AF. |
| windows | array(BDTWindow) | 1..1 | Windows when Background Data Transfers are requested/permitted.The array shall contain at least one window specification. |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| NOTE 1: Data type UsageThreshold are defined in TS 29.122 [29122]. |

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| **12th Change** |

#### 10.3.1.1 Background Data Transfer request

Editor's Note: Method that instantiates a dynamic policy for Background Data Transfer, with the estimated data transfer volume as input parameter.

Editor's Note: Awaiting contribution.

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| **13th Change** |

###  10.3.2 Dynamic Policy information

The Media Session Handler offers the Media-aware Application an API to register for and get notified upon availability of a Background Data Transfer opportunity. The Media-aware Application may also query the next Background Data Transfer time window and its constraints at any point in time by inspecting the status information specified below.Table 10.3.2-1 specifies the status information that can be obtained from the Media Session Handler through reference point M6.

Table 10.3.2-1: Status Information relating to Dynamic Policies

|  |  |  |  |
| --- | --- | --- | --- |
| Status | Type | Parameter | Definition |
| activeBdtPolicy | boolean |  | Indicates whether a Dynamic Policy with an associated Background Data Transfer policy is currently instantiated. |
| bdtPolicy | object |  | A description of the currently active Background Data Transfer policy (if any). |

Table 10.3.2-2 provides a list of general notification events exposed at reference point M6.

Table 10.3.2-2: Notification Events relating to Dynamic Policies

|  |  |  |
| --- | --- | --- |
| Event | Definition | Payload |
|  |  |  |
| BACKGROUND\_DATA\_TRANSFER\_WINDOW\_START | Notifies the application of the start of a Background Data Transfer window. | Media delivery session identifier,Window start date–time,Window end date–time,Data volume quota,Maximum uplink bit rate,Maximum downlink bit rate. |
| BACKGROUND\_DATA\_TRANSFER\_WINDOW\_END | Notifies the application of the end of a Background Data Transfer window. | Media delivery session identifier |

Table 10.3.3-3 provides a list of general error events exposed at reference point M6.

Table 10.3.2-3: Error Events relating to Dynamic Policies

|  |  |  |
| --- | --- | --- |
| Status | Definition | Payload |
| ERROR\_BACKGROUND\_DATA\_TRANSFER | Triggered when there is an error during a Background Data Transfer, for example if it is cancelled before the end of the advertised opportunity window or if the data volume transferred by the Media Access Function has exceeded the authorised limit. | Media delivery session identifier,Error reason. |
| ERROR\_BDT\_USAGE | Triggered when there is an error related to the usage of active BDT policy, e.g. as a result of excessive usage that exceeds the authorized data volume per UE. | error description |