ES2+ Interface Standard APIs Specification_v002

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ES2+ Interface Standard API:

The ES2+ interface enables operators to request Profile Package preparation for specific eUICCs and manage the Profile Package delivery from the SM-DP+.

Monty Mobile provides two categories of ES2+ APIs:

- Standard APIs – In compliance with GSMA specifications.

This robust API suite empowers operators with greater control and flexibility in managing eSIM profiles efficiently.

Below is a description of the ES2+ interface standard APIs provided by Monty Mobile for the Operators to call, and the inputs that need to be given upon calling them. All the information below is as specified by GSMA in SGP.22-v2.5.

Preprod and Production depoyment process for APIs

Deploying APIs in a secure and structured manner is critical to ensuring seamless integration and optimal performance. Below is the detailed process for Pre-Production and Production deployment, outlining each phase in a step-by-step approach:

1. Pre-Production Deployment Process

Step 1: VPN Establishment

- Before API testing begins, a VPN tunnel is established between Monty Mobile and the Operator's network to ensure secure communication.
- Monty Mobile shares the VPN form, which the Operator must complete and return to initiate the VPN tunnel creation.
- Once the VPN is established, Monty Mobile shares the Pre-Production (Preprod) environment IP address with the Operator.

Step 2: API Testing in Pre-Production

- The Operator integrates the APIs with their test batch and conducts end-to-end testing based on the shared User Acceptance Testing (UAT) plan.
- The testing phase ensures that:
    - API requests and responses function as expected.
    - Data integrity and security measures are validated.
    - Performance benchmarks are met, ensuring stability.

Step 3: UAT Sign-Off and Approval

- Once the Operator completes testing and validates API performance, they share a signed UAT approval form with Monty Mobile.
- This document confirms that the APIs have passed all necessary tests and can proceed to the Production environment.

2. Production Deployment Process

Step 4: Production Environment Setup

- After receiving the signed UAT approval, Monty Mobile configures the Production (Prod) environment with the same setup as the Pre-Production environment.
- The VPN tunnel for Production is established, and the Prod IP address is shared with the Operator.

Step 5: API Testing in Production

- The same testing procedures from Pre-Production are repeated in the Production environment to ensure:
    - The API functions correctly in the live system.
    - No latency issues affect real-time operations.

- Seamless communication with Operator's system.

Step 6: Go-Live Confirmation

- Once API testing is successfully completed, the Operator provides final confirmation for Go-Live.
- After this, the API is officially activated in Production mode.

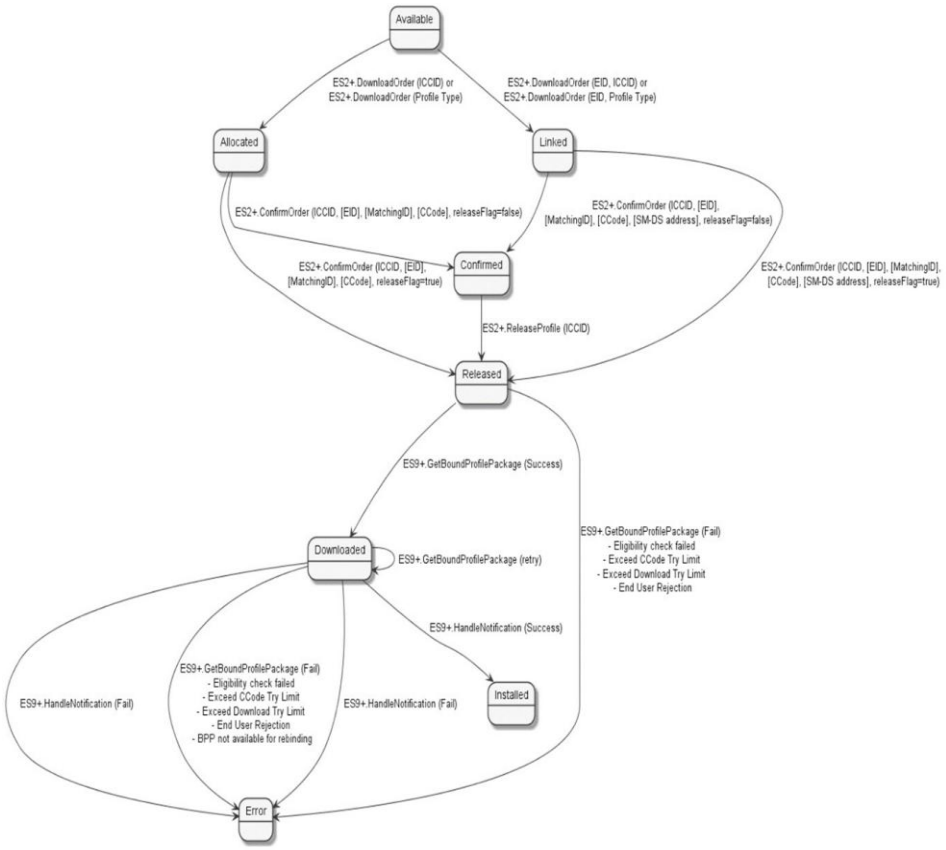
3. Key Benefits of API Integration

- Optimized & Automated Processes – APIs allow direct integration, reducing the need for manual intervention.
- Seamless Profile Downloads – Users can download profiles without scanning a QR code, enhancing the end-user experience.
- Improved Efficiency – Real-time API communication minimizes delays and optimizes profile management.
- Scalability & Future Enhancements – The system is built to support future API enhancements and expansions.

1. ES2+ Standard API & Profile state transitions

This section outlines how [Operator_Name] can facilitate profile preparation for an eUICC by leveraging Monty Mobile's SM-DP+ ES2+ interface.
The ES2+ interface provides MNOs with enhanced control over subscription management, enabling real-time activation, release, and provisioning of eSIM profiles. The following diagram illustrates the corresponding call flow.

The diagram below shows the transition of the profile's state during the standard ES2+ call flow:



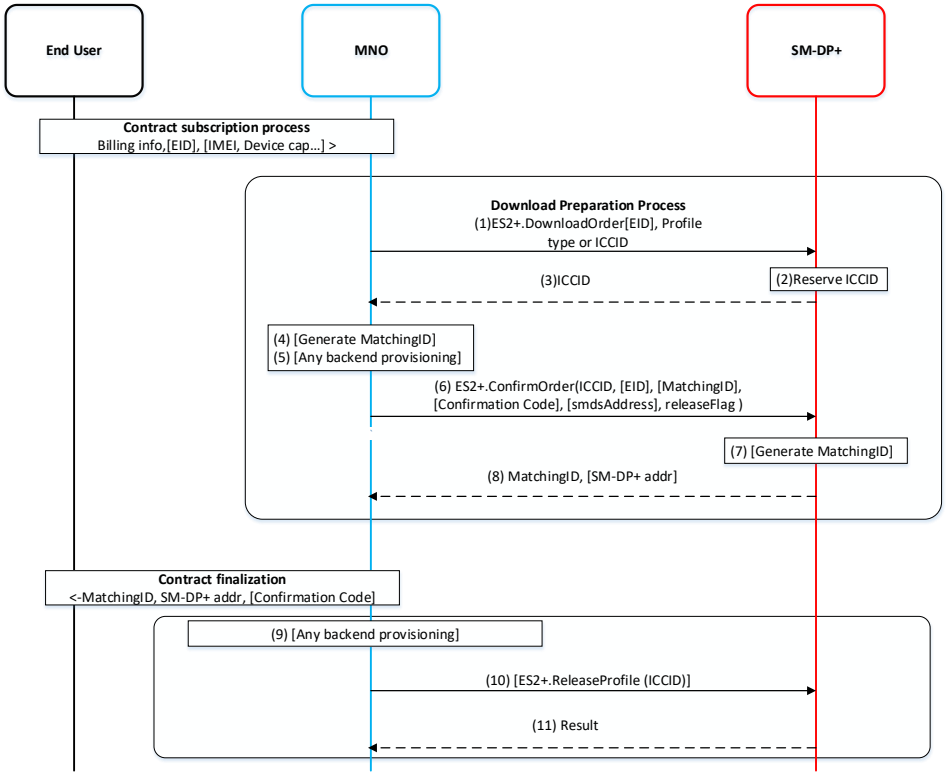


Figure 13: ES2+ Call flow

Download Preparation Process

1- The Operator calls the "ES2+.DownloadOrder" function of the SM-DP+ with the relevant input data, one of the value 'ProfileType' or 'ICCID' SHALL be provided or EID, the SM-DP+ SHALL verify that this ICCID is available.

2- The SM-DP+ reserves the ICCID for this request

3- The SM-DP+ returns the acknowledged ICCID

4- Optionally, the Operator MAY generate a MatchingID, At this stage the Operator knows the ICCID selected for this contract Subscription. It MAY perform any relevant operation on its Back-end (e.g. provisioning of HLR). If an error occurs during this step, the process fails and stops at this point.

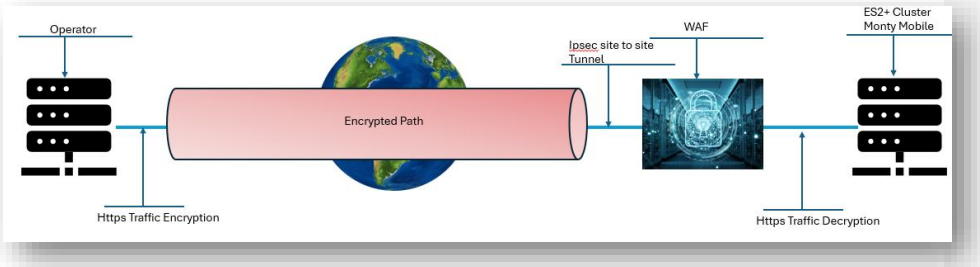
5- Till 8, The Operator SHALL confirm the download order by calling the "ES2+.ConfirmOrder function of the SM-DP+ with the ICCID and its relevant input data

The ES2+ interface is used by the Operator to order the Profile Package preparation for specific eUICC(s) and the delivery of the Profile Package from the SM-DP+.

Communication between MNO and Monty Mobile is protected with TLS mutual authentication.

Steps to provision the communication channel between the MNO and Monty Mobile:

- To initiate the creation of the VPN tunnel, Monty Mobile provides the VPN form to the Mobile Network Operator (MNO), who is then requested to complete and return it.
- Monty Mobile shares the functionRequesterIdentifier and functionCallIdentifier to configure while sending the request.
- Monty Mobile shares the https URL along with the end points.



1.1 DownloadOrder

This function is used to instruct the SM-DP+ of a new Profile download request.

Additional Input Parameters

Input data name	Description	Type	No.	MOC
eid	Identification of the targeted eUICC.	EID	1	O
iccid	Identification of the Profile to download and install in the eUICC.	ICCID	1	C
profileType	Identification of the Profile Type to download and install in the eUICC.	String	1	C

NOTE: The Operator can provide the ICCID and/or the Profile Type.

NOTE: The EID is optional and MAY is not known at this stage.

```
{
 "type": "object",
  "properties": {
   "eid": {
    "type": "string",
    "pattern": "^[0-9]{32}$",
    "description": "EID as desc in section 4.3.1 of SGP.22 v2.5"
   },
   "iccid": {
    "type": "string",
    "pattern": "^[0-9]{19}[0-9F]?$",
    "description": "ICCID as described in section 5.2.1 of SGP.22 v2.5"
   },
   "profileType": {
    "type": "string",
    "description": "content free information defined by the Operator"
   }
  }
 }
```

Additional Output Data

Output data name	Description	Type	No.	MOC
iccid	Identification of the Profile to download and install in the eUICC. If ICCID was provided as input data, the returned value SHALL be the same. If not provided as input data the returned value SHALL be one of the values available in the SMDP+ inventory and corresponding to the Profile Type.	ICCID	1	M

Request/Response JSON Examples

Sample request:

```
{
   "header": {
      "functionRequesterIdentifier": " functionRequesterIdentifier",
      "functionCallIdentifier": " functionCallIdentifier"
   },
   "eid": "89049032123451234512345678901235",
   "iccid": "01234567890123456789",
   "profileType": "profiletype1"
}
```

HTTP Response for a successful execution:

```
{
   "header": {
      "functionExecutionStatus": {
         "status": "Executed-Success"
      }
   },
   "iccid": "01234567890123456789"
}
```

HTTP Response for a failed execution:

```
{
   "header": {
      "functionExecutionStatus": {
         "status": "Failed",
         "statusCodeData": {
            "subjectCode": "8.2.5",
            "reasonCode": "3.7",
            "message": "No more Profile"
         }
      }
   }
}
```

NOTE: The subjectCode, reasonCode, and message are all sent as specified in the SGP.22-v2.5.

NOTE: This format applies for all failed executions of the API calls that will be mentioned below, the subjectCode, reasonCode, and message will change per the use case following the definition in the SGP.22-v2.5.

Specific status codes

Subject Code	Subject	Reason code	Reason	Description
8.2.1	Profile ICCID	3.9	Unknown	Indicates that the Profile, identified by this ICCID is unknown to the SM-DP+.
8.2.1	Profile ICCID	1.2	Not Allowed (Authorisation)	Indicates that the function caller is not allowed to perform this function on the target Profile.
8.2.1	Profile ICCID	3.3	Already in Use	Indicates that the Profile identified by the provided ICCID is not in the Available state.
8.2.5	Profile Type	3.9	Unknown	Indicates that the Profile Type identified by this Profile Type is unknown to the SM-DP+.
8.2.5	Profile Type	3.7	Unavailable	No more Profile available for the requested Profile Type.
8.2.5	Profile Type	3.8	Refused	Indicates that the Profile Type identified by this Profile Type is not aligned with the Profile Type of Profile identified by the ICCID.
1.6	Function	2.2	Mandatory Element Missing	Indicates that a mandatory input parameter of the function is missing.

1.2 ConfirmOrder

This function is used to confirm a previously requested download order.

Additional Input Parameters

Input data name	Description	Type	No.	MOC
iccid	Identification of the Profile to download and install in the eUICC	ICCID	1	M
eid	Identification of the targeted eUICC	EID	1	O
matchingId	The MatchingID defined as per the SGP.22 v2.5, when generated by the Operator	String	1	O
confirmationCode	A code used to authorize the usage of the MatchingID to confirm the download and installation of the Profile	String	1	O
releaseFlag	If 'true', the Profile SHALL be immediately released for Profile download and installation	Boolean	1	M

NOTE: If the EID is present in both the DownloadOrder and ConfirmOrder functions it SHALL be the same value.

```
{
 "type": "object",
 "properties": {
  "iccid": {
   "type": "string",
   "pattern": "^[0-9]{19}[0-9F]?$",
   "description": "ICCID as described in section 5.2.1 of SGP.22 v2.5"
  },
  "eid": {
   "type": "string",
   "pattern": "^[0-9]{32}$",
   "description": "EID as desc in section 4.3.1 of SGP.22 v2.5"
  },
  "matchingId": {
   "type": "string",
   "description": "as defined in section {5.3.2} of SGP.22 v2.5"
  },
  "confirmationCode": {
   "type": "string",
   "description": "as defined in section {5.3.2 of SGP.22 v2.5}"
  },
  "smdsAddress": {
   "type": "string",
   "description": "as defined in section {5.3.2 of SGP.22 v2.5}"
  },
  "releaseFlag" : {
   "type": "boolean",
   "description": "as defined in section {5.3.2} of SGP.22 v2.5"
  }
 },
```

```
  "required”: ["iccid", "releaseFlag"]
}
```

Additional Output Data

Output data name	Description	Type	No.	MOC
eid	Identification of the targeted eUICC. EID SHALL be returned if bound to this order.	EID	1	C
matchingId	The MatchingID is defined as per the SGP.22 v2.5, when generated by the Operator	String	1	M
smdpAddress	The SM-DP+ address to be used for this specific download order.	FQDN	1	O

Request/Response JSON Examples

Sample request:

```
{
    "header": {
        "functionRequesterIdentifier": "functionRequesterIdentifier",
        "functionCallIdentifier": "functionCallIdentifier"
    },
  "iccid": "01234567890123456789",
  "matchingId": "0A1B2-C3D4E-5F6G7-H8I9J",
  "eid": "89049032123451234512345678901235",
  "releaseFlag": false
}
```

HTTP Response for a successful execution:

```
{
  "header": {
    "functionExecutionStatus": {
      "status": "Executed-Success"
    }
  },
  "eid": "89049032123451234512345678901235",
  "matchingId": "0A1B2-C3D4E-5F6G7-H8I9J",
  "smdpAddress": "smdp.address.com"
```

Activation Code

Using the data received in the confirm order response you can construct the activation code which can be later used to download the confirmed profile using the raw activation code or encoded in a QR code format.

The Activation Code SHALL be coded to be the concatenation of the following strings listed in the following table:

Name	Description	MOC
AC_Format	Format of the Activation Code. SHALL be set to "1" for this Format of the Activation Code and any subsequent backward compatible Format	M
Delimiter	SHALL be set to "$"	M
SM-DP+ Address	FQDN (Fully Qualified Domain Name) of the SM-DP+ (e.g., SMDP.GSMA.COM) restricted to the Alphanumeric mode character set defined in table 5 of ISO/IEC 18004 [15] excluding '$'	M
Delimiter	SHALL be set to "$"	M
AC_Token	MatchingID	M
Delimiter	SHALL be present and set to "$" if any of the following optional parameters is present	C
SM-DP+ OID	SM-DP+ OID in the CERT.DPauth.ECDSA	O
Delimiter	SHALL be present and set to "$" if any of the following optional parameters is present	C
Confirmation Code Required Flag	SHALL be present and set to "1" if Confirmation Code is required; otherwise it SHALL be absent	O

Activation Code Structure table

The maximum length of the Activation Code SHALL be 255 characters, but in practice it is recommended to consider the user experience when choosing the length.

To support extension by future versions of this specification, the Device SHALL ignore a delimiter and any further parameters following those defined in Activation Code Structure table.

The Device SHALL treat an AC_Format other than "1" as invalid.

In **Monty Mobile's** case the returned parameters will be the SM-DP+ Address and matching ID (AC_Token as mentioned in the table) which you can use as follows (using the returned data in the successful response example):

- 1$smdp.address.com$0A1B2-C3D4E-5F6G7-H8I9J
  (in case confirmation code is not sent/required)
- 1$smdp.address.com$0A1B2-C3D4E-5F6G7-H8I9J$1
  (in case confirmation code is sent/required we add the last "1" preceded by a delimiter to indicate that the confirmation code is required when downloading)

More examples using the rest of the parameters mentioned in Activation Code Structure table can be found in SGP.22-v2.5 under section 4.1. When entered manually, the Activation Code SHALL be used as defined above.

When provided in a QR code according to ISO/IEC 18004 [15], the Activation Code SHALL be prefixed with "LPA:", hence using the above examples the final form to be converted to QR code will be:

- LPA:1$smdp.address.com$0A1B2-C3D4E-5F6G7-H8I9J
  (in case confirmation code is not sent/required)
- LPA:1$smdp.address.com$0A1B2-C3D4E-5F6G7-H8I9J$1

(in case confirmation code is sent/required we add the last "1" preceded by a delimiter to indicate that the confirmation code is required when downloading)

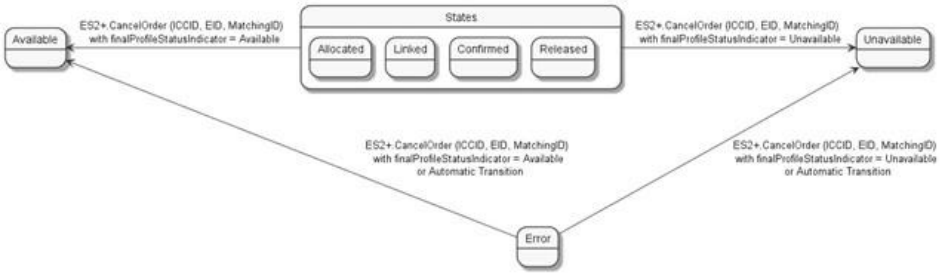
Specific status codes

Subject Code	Subject	Reason code	Reason	Description
8.2.1	Profile ICCID	3.9	Unknown	Indicates that the Profile, identified by this ICCID is unknown to the SM-DP+.
8.2.1	Profile ICCID	1.2	Not Allowed (Authorisation)	Indicates that the function caller is not allowed to perform this function on the target Profile.
8.2.6	Matching ID	3.3	Already in Use (Uniqueness)	Conflicting MatchingID value.
8.1.1	EID	3.10	Invalid Association	Indicates that a different EID is already associated with this ICCID.
8.2.1	Profile ICCID	3.5	Invalid Transition	Indicates that downloadOrder has not been called for this profile, i.e. the profile is neither in Allocated or Linked state.
8.2.1	Profile ICCID	3.3	Already in Use	The profile, identified by this ICCID, is already confirmed.

1.3 CancelOrder

This function is used to cancel a pending download order request.

State transitions



Additional Input Parameters

Input data name	Description	Type	No.	MOC
iccid	Identification of the Profile to be cancelled from previously requested download order.	ICCID	1	M
eid	eUICC Identifier.	EID	1	C
matchingId	The MatchingID as generated in ConfirmOrder.	String	1	C
finalProfileStatusIndicator	An indicator uses to indicate to the SM-DP+ to perform additional operations.	String	1	M

The eid input data SHALL be provided if an EID has been associated for the download order to cancel.

Final Profile Status Indicator	Description
Available	Indicates that the download order for this Profile, identified by this ICCID will be cancelled; and the ICCID is released back to the inventory and available for future use.
Unavailable	Indicates that the download order for this Profile, identified by this ICCID will be cancelled; and the ICCID is not available for future use.

```
{
 "type”: "object",
 "properties”: {
  "iccid”: {
   "type”: "string",
   "pattern”: "^[0-9]{19}[0-9F]?$",
   "description”: "ICCID as described in section 5.2.1 of SGP.22 v2.5
  },
  "eid”: {
```

```
  "type": "string",
  "pattern": "^[0-9]{32}$",
  "description": "EID as desc in section 4.3.1 of SGP.22 v2.5"
 },
 "matchingId": {
  "type": "string",
  "description": "as defined in section {5.3.2} of SGP.22 v2.5"
 },
 "finalProfileStatusIndicator": {
  "type": "string",
  "description": "as defined in section {5.3.4} of SGP.22 v2.5"
 }
},
"required": ["iccid"]
}
```

Commented [GK2]: V2.5

Additional Output Data

No additional output data besides functionExecutionStatus.

Request/Response JSON Examples

Sample request:

```
{
   "header": {
      "functionRequesterIdentifier": "functionRequesterIdentifier",
      "functionCallIdentifier": "functionCallIdentifier"
   },
  "iccid": "01234567890123456789",
  "matchingId": "0A1B2-C3D4E-5F6G7-H8I9J",
  "eid": "89049032123451234512345678901235",
  "finalProfileStatusIndicator": "Available"
}
```

HTTP Response for a successful execution:

```
{
  "header": {
    "functionExecutionStatus": {
      "status": "Executed-Success"
    }
  }
}
```

Specific status codes

Subject Code	Subject	Reason code	Reason	Description
8.2.1	Profile ICCID	3.9	Unknown	Indicates that the Profile, identified by this ICCID is unknown to the SM-DP+.
8.2.1	Profile ICCID	1.2	Not Allowed (Authorization)	Indicates that the function caller is not allowed to perform this function on the target Profile.
8.2.1	Profile ICCID	3.3	Already in Use	The profile, identified by this ICCID, is already downloaded.
8.2.1	Profile ICCID	3.10	Invalid Association	Indicates that a different EID is associated with this ICCID.
8.2.6	Matching ID	3.10	Invalid Association	Indicates that a different MatchingID is associated with this ICCID.
8.2.1	Profile ICCID	3.5	Invalid Transition	Invalid transition of Final Profile Status Indicator.

1.4 ReleaseProfile

This function is used to release the Profile in order to allow the End User to start the download and installation procedure after the Operator performs any relevant operation on its back-end (e.g. provisioning of HLR).

Additional Input Parameters

Input data name	Description	Type	No.	MOC
iccid	Identification of the Profile to be released from previously requested download order.	ICCID	1	M

```
{
 "type”: "object",
 "properties”: {
  "iccid”: {
   "type”: "string",
   "pattern”: "^[0-9]{19}[0-9F]?$",
   "description”: "ICCID as described in section 5.2.1"
   },
 "required”: ["iccid"]
 }
}
```

Additional Output Data

No additional output data besides functionExecutionStatus.

Request/Response JSON Examples

Sample request:

```
{
   "header": {
      "functionRequesterIdentifier": "functionRequesterIdentifier",
      "functionCallIdentifier": "functionCallIdentifier"
   },
  "iccid": "01234567890123456789"
}
```

HTTP Response for a successful execution:

```
{
  "header": {
    "functionExecutionStatus": {
      "status": "Executed-Success"
    }
  }
}
```

Specific status codes

Subject Code	Subject	Reason code	Reason	Description
8.2.1	Profile ICCID	3.9	Unknown	Indicates that the Profile, identified by this ICCID, is unknown to the SM-DP+.
8.2.1	Profile ICCID	1.2	Not Allowed (Authorisation)	Indicates that the function caller is not allowed to perform this function on the target Profile.
8.2.1	Profile ICCID	3.3	Already in Use	The profile, identified by this ICCID, is already downloaded.
8.2.1	Profile ICCID	3.5	Invalid transition	Indicates that the target Profile cannot be released, i.e. the profile state is not Confirmed using confirmOrder.

NOTE: Calling this function on an already Released profile will return an Executed-Success response.

1.5 HandleDownloadProgressInfo

Related Procedures: Profile Download and Installation

Notification Handler/Recipient: Operator

Description:

This function SHALL be used by the SM-DP+ to notify the Operator of the progress of a pending Profile download order request. This function MAY be used at several points of the Profile Download and Installation procedure. It is assumed that the ICCID and the EID are enough to identify the pending Profile download order request at the SM-DP+ and the Operator sides. It is also assumed that the ICCID is enough for the SM-DP+ to retrieve the Operator to notify.

Request Parameter: Request parameters to be transferred into body in JSON format

Input Data name	Description	Type	MOC
Header	Request Header	Object	M
functionRequesterIdentifier		String	M
functionCallIdentifier		String	M
eid	Identification of the targeted eUICC.	String	O
iccid	Identification of the Profile to download and install in the eUICC.	String	M
profileType	Identification of the Profile Type to download and install in the eUICC.	String	M
timeStamp	Indicates the date/time when the operation has been performed.	DateTime	M
notificationPointId	Indicates the step reached within the Profile Download and Installation procedure. Defined check points are (1): '1' -> Eligibility and retry limit check '2' -> Confirmation Failure '3' -> BPP download	INTEGER	M

	'4' -> BPP installation		
notificationPointStatus	Indicates the status after the execution of the notification point. The ExecutionStatus type is re-used to specify the result of processing of the operation related to the notification point (Executed-Success, Executed-WithWarning, Failed), and optionally to provide information on any encountered problem (status code, data/object that causes the status code, and message to provide textual and human readable explanation of the status code).	ExecutionStatus	M
resultData	The finalResult data object as contained in the ProfileInstallationResult, when received from the eUICC.	Binary	C

HandleDownloadProgressInfo Additional Input Data

NOTE 1: This specification reserves values from 0 to 99 for future use. The Operator and the SM-DP+, based on agreed behaviour, MAY define additional custom notification points. In that case, values >=100 SHALL be used.

Request Example :

HTTP POST /ecp/rsp2/es2plus/handleDownloadProgressInfo HTTP/1.1

Host: smdp.instant-connectivity.com

X-Admin-Protocol: gsma/rsp/v2.2.2

Content-Type: application/json

Content-Length: XXX

{

"header" : {

"functionRequesterIdentifier" : "RequesterID",

"functionCallIdentifier" : "TX-567",

},

"eid" : "0102030040506070809OA0B0C0D0EOF",

"iccid" : "01234567890123456789",

"profileType" : "myProfileType",

"timeStamp" : "2015-12-16T09:30:47Z",

"notificationPointId" : "4",

"notificationPointStatus" : {

"status" : "Executed-Success" } }

Response:

Input Data name	Description	Type	MOC
Header	Request Header	Object	M
functionExecutionStatus	ExecutionStatus	Object	M
status	Execution Status	String	M
statusCodeData	StatusCode	String	M
subjectCode		String	M
reasonCode		String	M
Message	Error Message	String	M
iccid	Identification of the Profile to download and install in the eUICC. If ICCID was provided as an input data, the returned value SHALL be the same. If not provided as an input data the returned value SHALL be one of the values available in the SM-DP+ inventory and corresponding to the Profile Type.	String	M