

Demand Flexibility Service 2.0: API Schema for Unit Meter Point Schedule Submissions and Bid Submissions

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Introduction

Following the launch of the Demand Flexibility Service (DFS) in winter 22/23 as part of our industry engagement and co-creation ESO received strong feedback that participants would value greater automation around the key data sharing processes. This document offers DFS providers the technical details for the API schema for the unit meter point schedule and bid submission process.

As part of the open Article 18 consultation ESO have proposed several changes to the service terms and therefore may be subject to change until that process concludes with the regulator. ESO hope that by offering an API option alongside the SharePoint process this will support industry in their delivery of the service.

For those parties who participated in DFS winter 22/23 please be aware that the submission documents have changed, and all parties will need to be aware of the updated file formats whether utilising the newly introduced API or existing SharePoint process. These details will subsequently be shared in our updated guidance material as we progress through the consultation process.

API Onboarding Process

DFS Support team will create an NG ID (one ID for Sandbox and one for PROD) for each registered provider willing to consume APIs for their BIDS and Unit Meter Point Schedule (MPAN) submissions following the contractual agreement.

The basic requirements to consume the API are:

1. Provider Name, Email, Contact number, DFS Registered Units – These details will be captured as part of DFS onboarding process with Single Market Platform (SMP) and DFS Contracts team.

Subsequently, DFS Support team will share the API credentials like `client_id`, `client_secret`, `grant_type`, `username`, `password` and `tenantID` (used to get the bearer token from Microsoft) to their registered Email address. Please head to **Get token from Microsoft for authentication of API** section for more details.

DFS Support team will also share the API URLs for MPAN and BIDS submissions along with API credentials to their registered Email address. These URLs can be used by providers for their BIDS and MPAN Submissions. The actual BIDS or MPAN data should be added in the body of the API and the authentication token (called bearer token) to be added in the header section of the API.

The API URLs will differ based on the DFS Event type – one URL for Sandbox testing and one for Production.

Data Headers for DFS Bids and Unit Meter Point Schedule Submissions.

Please find the column headers of BIDS and MPAN submissions.

DFS BIDS		Unit Meter Point Schedule (MPANs)	
Header	Mandatory	Header	Mandatory

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Delivery Date	Y	Submission Date	Y
Registered DFS Participant	Y	Registered DFS Participant	Y
DFS Unit ID	Y	Import MPAN	Y
DFS Volume MW	Y	Export MPAN	N
From	Y	MPANs Effective From	N
To	Y	MPANs Effective To	N
Utilisation price GBP per MWh	Y	MPANs Customer Consent Flag	N
North Scotland	N	Consent Effective From	N
South and Central Scotland	N	Consent Effective To	N
North East England	N	Sub Meter Serial Number	N
North West England	N	Timestamp Subscribed	Y
Yorkshire	N	Opt In	Y
East Midlands	N	HH Settled	Y
West Midlands	N	Consumer Type	Y
London	N	DFS Initiation Measure	Y
East England	N	Action	Y
South East England	N		
South West England	N		
Southern England	N		
North Wales Merseyside and Cheshire	N		
South Wales	N		
Other	N		
Total	N		

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Get token from Microsoft for authentication of API

The APIs for Unit Point Meter Schedule (MPAN) or DFS BIDs can only be consumed by authorised users of DFS platform. As part of the authorisation process, users should get the authentication token from Microsoft and use that token to get authorised by the DFS application while sending data via APIs. The following URL and the parameters can be used to get the authentication token.

Login URL*: <https://login.microsoftonline.com/<tenantID>/oauth2/v2.0/token>

Updated URL with tenantID will be shared at later stage once providers get onboarded

Parameters to be configured*:

client_secret:

grant_type: password

scope: api:

username: UserNGID (NG User ID needs to be filled in)

password: UserPassword (NG User Password needs to be filled in)

client_id:

The above parameters will be shared as part of Onboarding process

This call, if successful, will return a Bearer Token which is to be sent in the API call.

API call for DFS Bids and Unit Meter Point Schedule (MPAN):

The following are the API URLs used for sending the DFS Bids and MPAN data, respectively, to DFS Application. The actual Bids or MPAN data should be added in the body of the API and the authentication token (called as Bearer token) to be added in the headers section of API.

DFS BIDS API URL: URL will be shared as part of onboarding process

Token: Bearer Token

DFS MPAN API URL: URL will be shared as part of onboarding process

Token: Bearer Token

API payload size for DFS Bids and Unit Meter Point Schedule (MPAN)

IMPORTANT!

1. Providers are requested to divide the data records, primarily for Unit Meter Point Schedule Submissions (MPAN) and should send **not more than 5,000 records in a single API call**.
2. Providers can send the payload in multiple frequencies provided payload shouldn't contain more than 5000 records.
Example: - Assume Provider A to submit 100k records for a day, then provider A must submit the records in the batches (API calls) where each batch (API call) should not contain more than 5000 records. So, to submit 100k records, Provider A must split the 100k records and need to submit in 20 API calls(100k/5000).
3. API RATE Limit – 30 calls per minute.

DFS Bids API schema and payload

1. API Bids schema

The below contains the JSON schema (I.e., structure of the data to be sent in the body of the API) for DFS Bids. This schema can be used by the developers who wish to consume the API in their applications.

```
{
  "schema": {
    "items": {
      "properties": {
        "Delivery Date": {
          "type": "string"
        },
        "North West England": {
          "type": "integer"
        },
        "Yorkshire": {
          "type": "integer"
        },
        "East Midlands": {
          "type": "integer"
        },
        "West Midlands": {
          "type": "integer"
        },
        "London": {
          "type": "integer"
        },
        "East England": {
          "type": "integer"
        },
        "South East England": {
          "type": "integer"
        },
        "South West England": {
          "type": "integer"
        },
        "Southern England": {
          "type": "integer"
        },
        "North Wales Merseyside and Cheshire": {
          "type": "integer"
        },
        "Registered DFS Participant": {
          "type": "string"
        }
      }
    }
  }
}
```

```

"South Wales": {
  "type": "integer"
},
"Other": {
  "type": "integer"
},
"Total": {
  "type": "integer"
},
"DFS Unit ID": {
  "type": "string"
},
"DFS Volume MW": {
  "type": "integer"
},
"From": {
  "type": "string"
},
"To": {
  "type": "string"
},
"Utilisation price GBP per MWh": {
  "type": "integer"
},
"North Scotland": {
  "type": "integer"
},
"South and Central Scotland": {
  "type": "integer"
},
"North East England": {
  "type": "integer"
}
},
"required": [
  "Delivery Date",
  "North West England",
  "Yorkshire",
  "East Midlands",
  "West Midlands",
  "London",
  "East England",
  "South East England",
  "South West England",
  "Southern England",
  "North Wales Merseyside and Cheshire",
  "Registered DFS Participant",
  "South Wales",

```

```

        "Other",
        "Total",
        "DFS Unit ID",
        "DFS Volume MW",
        "From",
        "To",
        "Utilisation price GBP per MWh",
        "North Scotland",
        "South and Central Scotland",
        "North East England"
    ],
    "type": "object"
  },
  "type": "array"
}
}

```

2. DFS Bids submissions sample request JSON payload

As mentioned in the above section, providers who wish to consume the API in their application must send the DFS Bid data in JSON format in the body of the API. This is also called as payload of the API. The below shown JSON is a sample JSON payload which can be used as a reference by the providers who wish to consume the DFS Bids API.

Note: The order of the parameters does not matter if your submissions are through API.
Please find the request JSON payload as below

```

[
  {
    "Delivery Date": "07-06-2023",
    "North West England": 1,
    "Yorkshire": 0,
    "East Midlands": 1,
    "West Midlands": 1,
    "London": 1,
    "East England": 1,
    "South East England": 1,
    "South West England": 1,
    "Southern England": 0,
    "North Wales Merseyside and Cheshire": 0,
  }
]

```

```

"Registered DFS Participant": "Provider4",
"South Wales": 0,
"Other": 0,
"Total": 10,
"DFS Unit ID": "UNIT-001",
"DFS Volume MW": 10,
"From": "15:00",
"To": "15:30",
"Utilisation price GBP per MWh": 200,
"North Scotland": 1,
"South and Central Scotland": 1,
"North East England": 1
},
{
"Delivery Date": "07-06-2023",
"North West England": 1,
"Yorkshire": 1,
"East Midlands": 6,
"West Midlands": 1,
"London": 1,
"East England": 1,
"South East England": 1,
"South West England": 1,
"Southern England": 1,
"North Wales Merseyside and Cheshire": 1,
"Registered DFS Participant": "Provider4",
"South Wales": 1,
"Other": 1,
"Total": 20.8,
"DFS Unit ID": "UNIT-002",

```

```

"DFS Volume MW": 20.8,
"From": "16:00",
"To": "16:30",
"Utilisation price GBP per MWh": 450,
"North Scotland": 1.8,
"South and Central Scotland": 1,
"North East England": 1
}
]

```

3. Response code and message for Bid submissions.

The following are response codes which shows the status of the DFS Bid API call made. This will help users understand the status of their API calls in terms success and failure.

Code: 202 Accepted

```

{
"code": "202 Accepted",
"message": "A request has been submitted for further processing. An email will be triggered if any errors are identified."
}

```

Note: -

- As soon as providers send their submissions, this response code will be triggered to respective providers informing the request is successfully received.
- If the data has passed all the validations and data gets accepted, providers will be notified with the success message via email.
- If data has not passed all the validations and data gets rejected, providers will be notified with the suitable error message via email.

FAILURE SCENARIOS:

JSON Response Codes

Code: 400 BAD REQUEST

```

{
"code": "400 Bad Request",
"message": "Error identified in the submitted data. An email will be triggered with further details."
}

```

Code: 503 Service Unavailable

```
{
  "code": "503 Service unavailable",
  "message": "Unable to connect to the server. Please try after some time."
}
```

Code: 429 Too Many Requests

```
{
  "code": "429 Service unavailable",
  "message": "Too Many requests. Please try after some time."
}
```

Non-JSON Response Codes

Code: 401 Unauthorized

Message: "Invalid token"

Code: 402 Forbidden

Message: "Requested resource not found"

Code: 403 Forbidden

Message: "Insufficient Permissions"

4. Examples

Response Code: **202 Accepted**

```
{
  "code": "202 Accepted",
  "message": "A request has been submitted for further processing. An email will be triggered if any errors are identified."
}
```

```
[
  {
    "Date": "14-08-2023",
    "North West England": 1,
    "Yorkshire": 0,
    "East Midlands": 1,
    "West Midlands": 1,
    "London": 1,
    "East England": 1,
    "South East England": 1,
    "South West England": 1,
    "Southern England": 0,
    "North Wales Merseyside and Cheshire": 0,
    "Registered DFS Participant": "Provider 1",
    "South Wales": 0,
    "Other": 0,
    "Total": 10,
    "DFS Unit ID": "Unit-A",
    "DFS Volume MW": 10,
    "From": "15:00",
    "To": "15:30",
    "Utilisation price GBP per MWh": 200,
    "North Scotland": 1,
    "South and Central Scotland": 1,
    "North East England": 1
  }
]
```

- **Response Code: 202 Accepted**

```
{
  "code": "202 Accepted",
  "message": "A request has been submitted for further processing. An email will be triggered if any errors are identified."
}
```

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- *Example 2 Invalid Delivery Date*

```
[
  {
    "Delivery Date": "14-08-2024",
    "North West England": 1,
    "Yorkshire": 0,
    "East Midlands": 1,
    "West Midlands": 1,
    "London": 1,
    "East England": 1,
    "South East England": 1,
    "South West England": 1,
    "Southern England": 0,
    "North Wales Merseyside and Cheshire": 0,
    "Registered DFS Participant": "Provider 1",
    "South Wales": 0,
    "Other": 0,
    "Total": 10,
    "DFS Unit ID": "Unit-A",
    "DFS Volume MW": 10,
    "From": "15:00",
    "To": "15:30",
    "Utilisation price GBP per MWh": 200,
    "North Scotland": 1,
    "South and Central Scotland": 1,
    "North East England": 1
  }
]
```

-

DFS Unit Meter Point Schedule (MPAN) Submissions API Schema and PAYLOAD

1. Unit Meter Point Schedule (MPAN) API schema

Please find the API Schema for DFS Unit Meter Point Schedule (MPAN) submissions below which contains the JSON schema (i.e., structure of the data to be sent in the body of the API) for MPAN. This schema can be used by the developers who wish to consume the API in their applications.

```
{
```

```
"$schema": "http://json-schema.org/draft-04/schema#",  
"type": "array",  
"items": [  
  {  
    "type": "object",  
    "properties": {  
      "Submission Date": {  
        "type": "string"  
      },  
      "Registered DFS Participant": {  
        "type": "string"  
      },  
      "Import MPAN": {  
        "type": "string"  
      },  
      "Export MPAN": {  
        "type": "string"  
      },  
      "MPANs Effective From": {  
        "type": "string"  
      },  
      "MPANs Effective To": {  
        "type": "string"  
      },  
      "MPANs Customer Consent Flag": {  
        "type": "string"  
      },  
      "Consent Effective From": {  
        "type": "string"  
      },  
    },  
  },  
]
```

```
"Consent Effective To": {
  "type": "string"
},
"Sub Meter Serial Number": {
  "type": "string"
},
"Timestamp Subscribed": {
  "type": "string"
},
"Opt In": {
  "type": "boolean"
},
"HH Settled": {
  "type": "boolean"
},
"Consumer Type": {
  "type": "string"
},
"DFS Initiation Measure": {
  "type": "string"
},
"Action": {
  "type": "string"
}
},
"required": [
  "Submission Date",
  "Registered DFS Participant",
  "Import MPAN",
  "Timestamp Subscribed",
```

```

    "Opt In",
    "HH Settled",
    "Consumer Type",
    "DFS Initiation Measure",
    "Action"
  ]
}
]
}

```

2. MPAN API sample request JSON payload

As mentioned in the above section, providers who wish to consume the API in their application must send the MPAN data in JSON format in the body of the API. This is also called as payload of the API. The below shown JSON is a sample JSON payload which can be used as a reference by the providers who wish to consume the MPAN API.

Note: The order of the parameters does not matter if your submissions are through API.

Please find the request JSON payload as below

```

[
  {
    "Submission Date": "11-11-2023",
    "Registered DFS Participant": "Provider4",
    "Import MPAN": "1012345931959",
    "Export MPAN": "1012345832928",
    "MPANs Effective From": "11-11-2023",
    "MPANs Effective To": "11-12-2023",
    "MPANs Customer Consent Flag": "true",
    "Consent Effective From": "11-11-2023",
    "Consent Effective To": "11-12-2023",
    "Sub Meter Serial Number": "y14146a",
    "Timestamp Subscribed": "11-11-2023 21:00",
    "Opt In": true,
    "HH Settled": false,
  }
]

```

```

"Consumer Type": "Domestic",
"DFS Initiation Measure": "Manually Initiated",
"Action": "Add"
},
{
"Submission Date": "11-11-2023",
"Registered DFS Participant": "Provider4",
"Import MPAN": "1012345890335",
"Export MPAN": "1012345086134",
"MPANs Effective From": "11-11-2023",
"MPANs Effective To": "11-12-2023",
"MPANs Customer Consent Flag": "true",
"Consent Effective From": "11-11-2023",
"Consent Effective To": "11-12-2023",
"Sub Meter Serial Number": "y14146a",
"Timestamp Subscribed": "11-11-2023 21:00",
"Opt In": true,
"HH Settled": false,
"Consumer Type": "Industrial & Commercial",
"DFS Initiation Measure": "Manually Initiated",
"Action": "Add"
}
]

```

3. Response code and message for MPAN API Submissions

The following are response codes which shows the status of the DFS Bid API call made. This will help users understand the status of their API calls in terms success and failure.

Code: 202 Accepted

```

{
"code": "202 Accepted",

```

"message": "A request has been submitted for further processing. An email will be triggered if any errors are identified."

}

Note: -

- As soon as providers send their submissions, this response code will be triggered to respective providers informing the request is successfully received.
- If the data has passed all the validations and data gets accepted, providers will be notified with the success message via email.
- If data has not passed all the validations and data gets rejected, providers will be notified with the suitable error message via email.

FAILURE SCENARIOS:

JSON Response Codes

Code: 400 BAD REQUEST

```
{
  "code": "400 Bad Request",
  "message": "Error identified in the submitted data. An email will be triggered with further details."
}
```

Code: 503 Service Unavailable

```
{
  "code": "503 Service unavailable",
  "message": "Unable to connect to the server. Please try after some time."
}
```

Code: 429 Too Many Requests

```
{
  "code": "429 Service unavailable",
  "message": "Too Many requests. Please try after some time."
}
```

Non-JSON Response Codes

Code: 401 Unauthorized

Message: "Invalid token"

Code: 402 Forbidden

Message: "Requested resource not found"

Code: 403 Forbidden

Message: "Insufficient Permissions"

4. Example

Response Code: **202 Accepted**

```
{
  "code": "202 Accepted",
  "message": "A request has been submitted for further processing. An email will be triggered if any errors are identified."
}
```

Example 3 Incorrect submission date

```
[
  {
    "Submission Date": "02-08-2023",
    "Registered DFS Participant": "Provider 1",
    "Import MPAN": "2310000000060",
    "Export MPAN": "2310000000061",
    "MPANs Effective From": "11-11-2023",
    "MPANs Effective To": "11-11-2023",
    "MPANs Customer Consent Flag": "true",
    "Consent Effective From": "11-11-2023",
    "Consent Effective To": "11-11-2023",
    "Sub Meter Serial Number": "y14146a",
    "Timestamp Subscribed": "11-11-2022 21:00",
    "Opt In": true,
    "HH Settled": false,
    "Consumer Type": "Domestic",
    "DFS Initiation Measure": "Manually Initiated",
    "Action": "Add"
  },
]
```

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Version history

Number	Publication Date	Comments
1.0	01/08/2023	First Draft
2.0	08/08/2023	Modified BIDS API Schema – Changes the Data Type for some of the column headers and modified Response code 206 making it more understandable.
3.0	04/09/2023	Included API Onboarding steps and various submission examples.
5.0	27/09/2023	Amended API Response codes for BIDS and MPAN Submissions