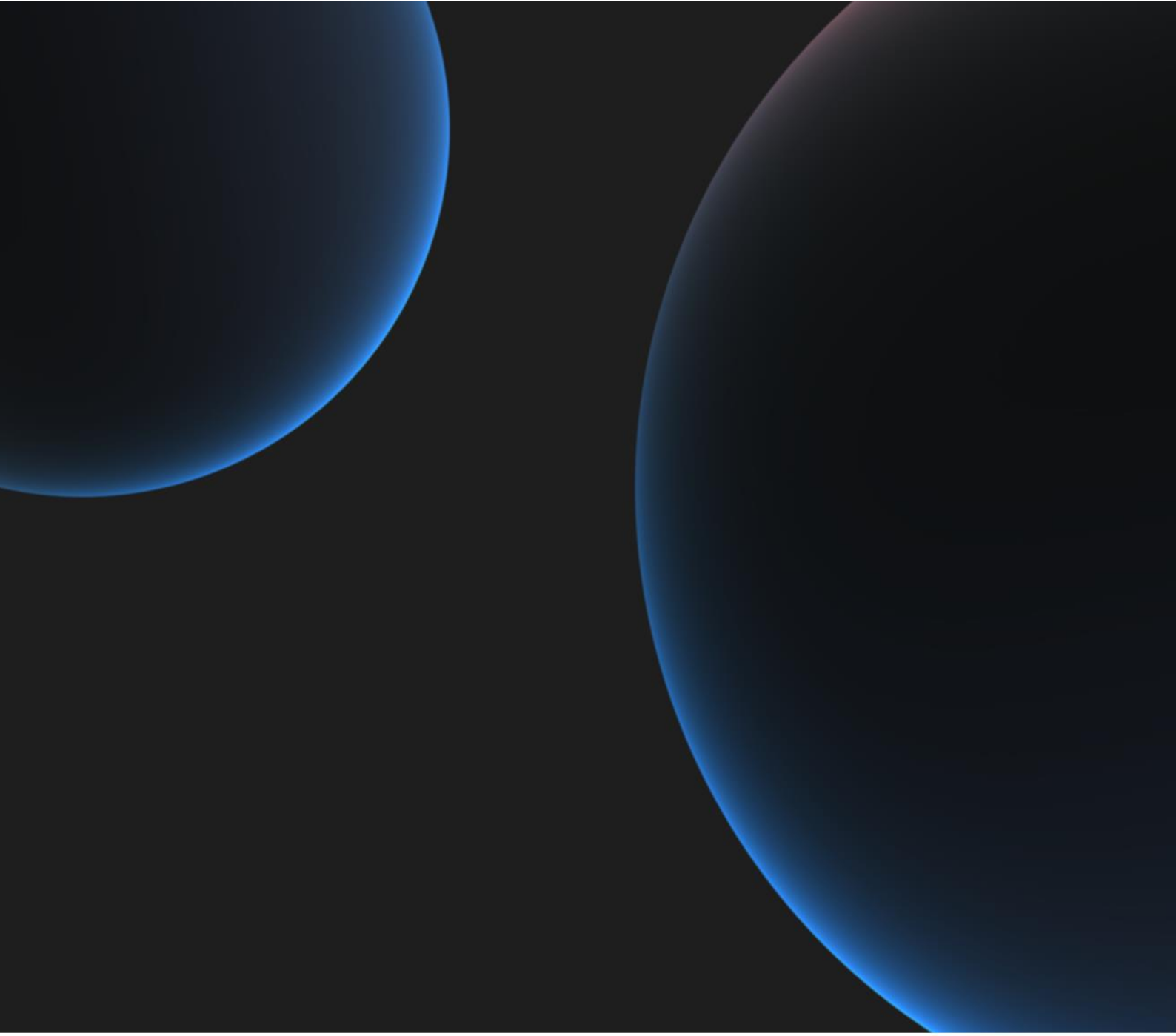

Univers EMS API User Manual

Rev. 1

univers

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Version Control

Rev.	Date	Description	Changed By	Approved By
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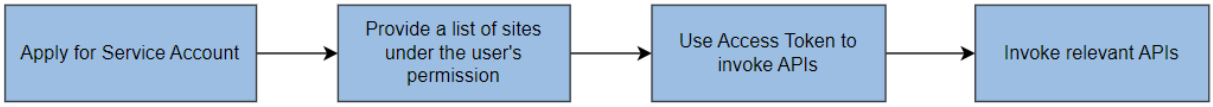
1 Introduction

This user manual is for third party users to invoke Univers EMS API to query data and/or remote control the onboarded devices.

1.1 Overall Flow



1.1.1 Step 1: Apply Service Account

The user will have to raise to the Univers Team to apply for a Service Account. The Univers Team will help the user to create a Service Account and configure the necessary settings.

Contact Univers Team at universems.it@univers.com.

1.1.2 Step 2: Provide Site List

User to provide a list of sites under the user's permission. Provide the site list to the Univers Team and the Univers Team will configure and authorize the site permissions to the user.

Contact Univers Team at universems.it@univers.com.

1.1.3 Step 3: Use Token to invoke APIs

1. The user will have to generate the access token with the application access key, secret key, and system timestamp and use it to invoke the APIs.

2. Univers Team will provide the access URL, access key and secret key to the user.

3. Please refer to the 'Invoke API Through Access Token' for the detailed steps on how to invoke APIs through access token.

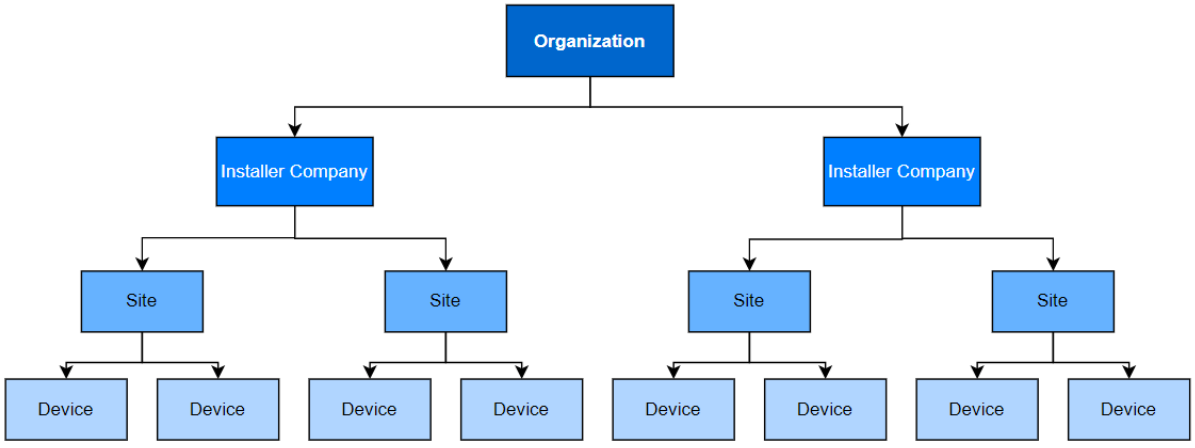
4. Depends on the result the user wants to achieve with the API, he/she can either send control command to devices or query relevant data.

1.2 Definition of Technical Terms

Technical terms	Definition	Example
Asset	Properties assigned to the user	Organization, company, site, device
Attribute	Fixed data	Capacity, onboarding date, address
Measurement Point	Timeseries data	Active power, production, consumption
Metric	Performance indicator displayed on frontend, which is done by a series of calculation of the measurement points	Production, consumption data displayed on the web/app portal frontend
Record	Non-time-series fact data.	Timezone, country, province, device model
Meta	All the types of datapoints under an asset.	A list of measurement point, attribute and metrics for a site or a device

1.3 Asset Hierachy

Univers EMS portals uses four levels of hierachy to organize the assets:



2 API Sequence

2.1 Steps to Send Control Command

Step No.	Description	Request Parameter	Response Parameter
1	Make sure you are using Access Token to invoke APIs.	-	-
2	Invoke API Query Hierarchy to get a site list.	**orgId**: provided by Univers **mdmIds**: provided by Univers	**mdmIds**: Site ID
3	Invoke API Query Hierarchy again to get a device list under the site	**orgId**: provided by Univers **mdmIds**: Step 2's response	**mdmIds**: Device ID
4	Invoke API Send Control Command to send control command to the specific device.	**controlAssetId**: Step 3's response	-

2.2 Steps to Query Data

2.2.1 Attribute, Measurement Point and Metric Data

Step No.	Description	Request Parameter	Response Parameter
1	Make sure you are using Access Token to invoke APIs.	-	-

2	Invoke API Query Accessible Asset Type to ge the types of asset that you can access.	**orgId**: provided by Univers **mdmIds**: provided by Univers	**mdmType**: type of asset
3	Invoke API Query Hierarchy to get a site list.	**orgId**: provided by Univers **mdmIds**: provided by Univers	**mdmIds**: Site ID
4	Invoke API Query Hierarchy again to get a device list under the site	**orgId**: provided by Univers mdmIds: Step 3's response	**mdmIds**: Device ID
5	Invoke API Query Generic Meta to check the data that you can get for this device/site/asset type. Note: You can either input **mdmIds** or **mdmType** in the request or **both** in the request. If **both** are in the request, mdmIds will have higher priority than mdmType.	**orgId**: provided by Univers **mdmType**: Step 2's response **mdmIds**: Step 3's response or Step 4's response	**Datapoints**: attribute, measurementPoint, metric
6	If you want to get the attribute data, invoke Query Asset Attribute Data.	**orgId**: provided by Univers **mdmIds**: Step 3's response or Step 4's response **attributes:** Step 5's response in attribute	Attribute data
	If you want to get the latest measurement point data, invoke Query Real-Time Measurement Point Data.	**orgId**: provided by Univers **mdmIds**: Step 3's response or Step 4's response **pointIds:** Step 5's response in measurementPoint	Measurement Point Data

	If you want to get the historical measurement point data, invoke Query Historical Measurement Point Data.	**orgId**: provided by Univers **mdmIds**: Step 3's response or Step 4's response **pointIdsWithLogic:** Step 5's response in measurementPoint and with logics described in the Query Historical Measurement Point Data document	Measurement Point Data
	If you want to get the latest metric data, invoke Query Real-Time Metric Data.	**orgId**: provided by Univers **mdmIds**: Step 3's response or Step 4's response **metrics:** Step 5's response in metrics	Metric Data
	If you want to get the historical metric data, invoke Query Historical Metric Data.	**orgId**: provided by Univers **mdmIds**: Step 3's response or Step 4's response **metrics:** Step 5's response in metrics	Metric Data

2.2.2 Record Data

Step No.	Description	Request Parameter	Response Parameter
1	Make sure you are using Access Token to invoke APIs.	-	-

2	Invoke API Query Record Meta to check the record data that you can get for this organization	**orgId**: provided by Univers	**recordTypes:** record data types
3	To get the data of the specific record type, invoke API Query Record Data.	**orgId**: provided by Univers **recordTypes:** Step 2's response	Record Data

3 APIs

3.1 Query Accessible Asset Type

This API is used when the user wants to get a list of accessible asset types under his/her authorization.

3.1.1 Request Format

```
GET https://{api-gateway}/cds-asset-service/v1.0/accessible-asset-type?action=query
```

3.1.2 Request Parameters

Name	Location	Mandatory/Optional	Data Type	Description
orgId	Query	Mandatory	String	The organization ID which the asset type belongs to. **This will be provided by Univers Team.**
locale	Query	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.
withI18n	Query	Optional	Boolean	Whether to return the internationalization content. The value is true or false. Default is false.
withElement-GroupInfo	Query	Optional	Boolean	Whether to return the visualization group information. The default value is true.

3.1.3 Response Content Type

```
application/json; charset = UTF-8
```

3.1.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
mdmType	Definitely	String	The corresponding object type.
modelId	Conditionally	String	The model ID which the asset type is associated with.
amcType	Conditionally	String	The identifier of the corresponding asset type in Configuration Center.
domain	Definitely	String	The identifier of the domain that the asset type belongs to.
domainName	Definitely	String	The name of the domain that the asset type belongs to in the corresponding request language.
domainNameI18n	Conditionally	I18n Struct	Describe the internalization content of the domain name.
isSite	Conditionally	Boolean	Whether the asset type is a site type.
isDeviceGroup	Conditionally	Boolean	Whether the asset type is a device group type.
name	Definitely	String	The name of the asset type in the corresponding request language.
nameI18n	Conditionally	I18n Struct	Describe the internalization content of the asset type.
icons	Conditionally	Map (The Key and Value are of the String type)	The display icon of the asset type.
dimensions	Conditionally	Map (The Key is of the String type and the Value is a Dimension Struct)	The supported aggregation dimensions.
dimensionPermutation	Conditionally	String	The supported Dimension Combination Attribute of the asset type.
groups	Conditionally	Group Struct	Describe the visualization group information of the asset type.

3.1.4.1 I18n Struct

Name	To Return Definitely/Conditionally	Data Type	Description
defaultValue	Definitely	String	The default content.
en_US	Conditionally	String	The English content.
zh_CN	Conditionally	String	The Chinese content.
es_ES	Conditionally	String	The Spanish content.
ja_JP	Conditionally	String	The Japanese content.

3.1.4.2 Dimension Struct

Name	To Return Definitely/Conditionally	Data Type	Description
name	Definitely	String	The name of the dimension in the corresponding request language.
nameI18n	Conditionally	I18n Struct	Describe the internalization content of dimension name. See I18n Struct.
level	Definitely	String	The level of the dimension. *child* indicates a one-to-many dimension and *self* indicates a one-to-one dimension.
attribute	Conditionally	String	The attribute used to describe the dimension identifier.
nameAttribute	Conditionally	String	The attribute used to describe the dimension name.
enumSource	Conditionally	String	The source of the enumeration values of the enumerated dimension.
enumerate	Conditionally	String	The static enumeration values.
recordType	Conditionally	String	The identifier of the record type associated with the enumeration values.
recordMapping	p-Conditionally	Map (The Key and Value are of the String type)	The fields of the record type associated with the enumeration values.
filters	Conditionally	String	The supported filters of the dimension.
mdmType	Conditionally	String	The corresponding object type of the dimension.

3.1.4.3 Group Struct

Name	To Return Definitely/Conditionally	Data Type	Description
groupName	Definitely	String	The name of the visualization group in the corresponding request language.
groupNameI18n	Conditionally	I18n Struct	Describe the internalization content of the visualization group name. See I18n Struct.
groupOrder	Definitely	Integer	The order of the visualization group.
elementName	Definitely	String	The name of the element in the visualization group in the corresponding request language.
elementNameI18n	Conditionally	I18n Struct	Describe the internalization content of the element. See I18n Struct.
elementOrder	Definitely	Integer	The order of the element in the visualization group.
area	Definitely	Map (The Key is of the String type and the Value is an Area Struct)	Describe the area in the visualization group. See Area Struct.

3.1.4.4 Area Struct

Name	To Return Definitely/Conditionally	Data Type	Description
areaName	Definitely	String	The name of the area in the corresponding request language.

are-aNameI18n	Conditionally	I18n Struct	Describe the internalization content of the area name. See I18n Struct.
areaOrder	Definitely	Integer	The order of the area.

3.1.5 Samples

Request Sample

```
curl  -X GET \

  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/asset/v1.0/accessible-asset-type?orgId=o16793658440861006&withI18n=true&locale=zh_CN'
```

Response Sample


```
{
  "msg": "OK",
  "code": 0,
  "data": [
    {
      "modelId": "EnOS_Solar_RE_INV",
      "mdmType": "Res_Inverter",
      "domain": "ResSolar",
      "domainName": "户用光伏",
      "domainNameI18n": {
        "defaultValue": "Residential Solar",
        "i18nValue": {
          "en_US": "Residential Solar",
          "zh_CN": "户用光伏"
        }
      },
      "isSite": false,
      "isDeviceGroup": false,
      "name": "户用逆变器",
      "nameI18n": {
        "defaultValue": "Residential Inverter",
        "i18nValue": {
          "en_US": "Residential Inverter",
          "zh_CN": "户用逆变器"
        }
      },
      "icons": {
        "2d": "/hossain-icon/Res_Inverter.svg",
```

```
    "Quasi-physical": "/hossain-icon/Res_Inverter.svg"
  },
  "dimensions": {
    "DQAggregationDimension": {
      "level": "child",
      "name": "全部测点",
      "nameI18n": {
        "defaultValue": "全部测点",
        "i18nValue": {
          "en_US": "All Points",
          "zh_CN": "全部测点"
        }
      },
      "enumSource": "static",
      "enumerate": {
        "1": {
          "name": "全部",
          "nameI18n": {
            "defaultValue": "All",
            "i18nValue": {
              "en_US": "All",
              "zh_CN": "全部"
            }
          }
        }
      },
      "filters": "==,!=,in"
    },
    "requestType": {
      "level": "child",
      "name": "服务请求类型",
      "nameI18n": {
        "defaultValue": "Service Request Type",
        "i18nValue": {
          "en_US": "Service Request Type",
          "zh_CN": "服务请求类型"
        }
      },
      "enumSource": "static",
      "enumerate": {
        "1": {
          "name": "预防性维护",
          "nameI18n": {
```

```
      "defaultValue": "PreventiveMaintenance",
      "i18nValue": {
        "en_US": "PreventiveMaintenance",
        "es_ES": "",
        "ja_JP": "予防保守",
        "zh_CN": "预防性维护"
      }
    }
  },
  "2": {
    "name": "故障维修",
    "nameI18n": {
      "defaultValue": "CorrectiveMaintenance",
      "i18nValue": {
        "en_US": "CorrectiveMaintenance",
        "es_ES": "",
        "ja_JP": "修正保守",
        "zh_CN": "故障维修"
      }
    }
  },
  "3": {
    "name": "事件汇报",
    "nameI18n": {
      "defaultValue": "EventReport",
      "i18nValue": {
        "en_US": "EventReport",
        "es_ES": "",
        "ja_JP": "イベント報告",
        "zh_CN": "事件汇报"
      }
    }
  },
  "4": {
    "name": "紧急抢修",
    "nameI18n": {
      "defaultValue": "EmergencyMaintenance",
      "i18nValue": {
        "en_US": "EmergencyMaintenance",
        "es_ES": "",
        "ja_JP": "緊急メンテナンス",
        "zh_CN": "紧急抢修"
```

```
            }
           }
          }
         },
         "filters": "==,!=,in"
        },
        "workOrderPriority": {
         "level": "child",
         "name": "工单优先级",
         "nameI18n": {
          "defaultValue": "Work Order Priority",
          "i18nValue": {
           "en_US": "Work Order Priority",
           "zh_CN": "工单优先级"
          }
         },
         "enumSource": "static",
         "enumerate": {
          "1": {
           "name": "高",
           "nameI18n": {
            "defaultValue": "High",
            "i18nValue": {
             "en_US": "High",
             "es_ES": "",
             "ja_JP": "高",
             "zh_CN": "高"
            }
           }
          },
          "2": {
           "name": "中",
           "nameI18n": {
            "defaultValue": "Normal",
            "i18nValue": {
             "en_US": "Normal",
             "es_ES": "Normal",
             "ja_JP": "正常",
             "zh_CN": "中"
            }
           }
          },
          "3": {
```

```
            "name": "低",
            "nameI18n": {
              "defaultValue": "Low",
              "i18nValue": {
                "en_US": "Low",
                "es_ES": "",
                "ja_JP": "低",
                "zh_CN": "低"
              }
            }
          },
          "4": {
            "name": "未指定",
            "nameI18n": {
              "defaultValue": "None",
              "i18nValue": {
                "en_US": "None",
                "es_ES": "",
                "ja_JP": "なし",
                "zh_CN": "未指定"
              }
            }
          }
        },
        "filters": "==,!=,in"
      },
      "DQPoint": {
        "level": "child",
        "name": "测点",
        "nameI18n": {
          "defaultValue": "测点",
          "i18nValue": {
            "en_US": "Point",
            "zh_CN": "测点"
          }
        },
        "enumSource": "record",
        "recordType": "searchDQPoint",
        "recordMapping": {
          "type.modelId": "modelId",
          "id": "id",
          "name": "name"
```

```
    },
    "filters": "==,!=,in"
  },
  "workType": {
    "level": "child",
    "name": "工单类型",
    "nameI18n": {
      "defaultValue": "Work Order Type",
      "i18nValue": {
        "en_US": "Work Order Type",
        "zh_CN": "工单类型"
      }
    },
    "enumSource": "static",
    "enumerate": {
      "1": {
        "name": "预防性维护",
        "nameI18n": {
          "defaultValue": "PreventiveMaintenance",
          "i18nValue": {
            "en_US": "PreventiveMaintenance",
            "es_ES": "",
            "ja_JP": "予防保守",
            "zh_CN": "预防性维护"
          }
        }
      },
      "2": {
        "name": "故障维修",
        "nameI18n": {
          "defaultValue": "CorrectiveMaintenance",
          "i18nValue": {
            "en_US": "CorrectiveMaintenance",
            "es_ES": "",
            "ja_JP": "修正保守",
            "zh_CN": "故障维修"
          }
        }
      },
      "3": {
        "name": "事件汇报",
        "nameI18n": {
```

```
            "defaultValue": "EventReport",
            "i18nValue": {
              "en_US": "EventReport",
              "es_ES": "",
              "ja_JP": "イベント報告",
              "zh_CN": "事件汇报"
            }
          }
        },
        "4": {
          "name": "紧急抢修",
          "nameI18n": {
            "defaultValue": "EmergencyMaintenance",
            "i18nValue": {
              "en_US": "EmergencyMaintenance",
              "es_ES": "",
              "ja_JP": "緊急メンテナンス",
              "zh_CN": "紧急抢修"
            }
          }
        }
      },
      "filters": "==,!=,in"
    },
    "serviceRequestPriority": {
      "level": "child",
      "name": "服务请求优先级",
      "nameI18n": {
        "defaultValue": "Service Request Priority",
        "i18nValue": {
          "en_US": "Service Request Priority",
          "zh_CN": "服务请求优先级"
        }
      },
      "enumSource": "static",
      "enumerate": {
        "1": {
          "name": "高",
          "nameI18n": {
            "defaultValue": "High",
            "i18nValue": {
              "en_US": "High",
              "es_ES": "",
```

```
            "ja_JP": "高",
            "zh_CN": "高"
          }
        }
      },
      "2": {
        "name": "中",
        "nameI18n": {
          "defaultValue": "Normal",
          "i18nValue": {
            "en_US": "Normal",
            "es_ES": "Normal",
            "ja_JP": "正常",
            "zh_CN": "中"
          }
        }
      },
      "3": {
        "name": "低",
        "nameI18n": {
          "defaultValue": "Low",
          "i18nValue": {
            "en_US": "Low",
            "es_ES": "",
            "ja_JP": "低",
            "zh_CN": "低"
          }
        }
      },
      "4": {
        "name": "未指定",
        "nameI18n": {
          "defaultValue": "None",
          "i18nValue": {
            "en_US": "None",
            "es_ES": "",
            "ja_JP": "なし",
            "zh_CN": "未指定"
          }
        }
      }
    },
```

```
          "filters": "==,!=,in"
        },
        "DQGroup": {
          "level": "child",
          "name": "测点组",
          "nameI18n": {
            "defaultValue": "测点组",
            "i18nValue": {
              "en_US": "Point Group",
              "zh_CN": "测点组"
            }
          },
          "enumSource": "record",
          "recordType": "searchDQGroup",
          "recordMapping": {
            "type.modelId": "modelId",
            "id": "id",
            "name": "name"
          },
          "filters": "==,!=,in"
        }
      }
    }
  ],
  "traceId": "65eacffcf94cd5fd3b148bd4af34e9ec",
  "globalTraceId": "716415a32d4e4da5"
}
```


3.2 Query Accessible Asset

This API is used to get the sites and the devices under the user's authorization.

3.2.1 Request Format

```
GET https://{api-gateway}/cds-asset-service/v1.0/hierarchy?action=query
```

3.2.2 Request Parameters

Name	Location	Mandatory/Optional	Data Type	Description
orgId	Query	Mandatory	String	The organization ID which the asset belongs to. **This will be provided by Univers Team.**
mdmIds	Query/Form	Mandatory	String	The object instance ID of the asset. Separate multiple IDs by commas. Up to 20000 object instances are allowed in a single query. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
mdmTypes	Query/Form	Optional	String	The object type ID which the asset belongs to. Separate multiple IDs by commas. Up to 100 object type IDs are allowed in a single query. All child hierarchies will be returned if *mdmTypes* is not set.
attributes	Query/Form	Optional	String	The attribute of the asset. Separate multiple attributes by commas. Both model attributes and "virtual attributes" defined in Common Data Service are supported.

locale	Query/Form	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.
withI18n	Query/Form	Optional	Boolean	Whether to return the internationalization content. The value is true or false. Default is false.
filter	Query/Form	Optional	String	If you specify the value of the name field, you can specify the value in the

3.2.3 Response Content Type

```
application/json; charset = UTF-8
```

3.2.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
data	Definitely	Asset Struct	Describe the asset information.
pagination	Definitely	Pagination Struct	Describe the pagination information.

3.2.4.1 Pagination Struct

Name	To Return Definitely/Conditionally	Data Type	Description
pageNo	Definitely	Integer	The number of page to be returned, starting from 1.
pageSize	Definitely	Integer	The number of the returned records on a single page.
totalSize	Definitely	Integer	The total number of the returned records.

3.2.5 Samples

Request Sample

```
curl  -X GET \

  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/asset/v1.0/accessible-asset?orgId=o16227961710541858&mdmTypes=EnOS_Solar_Site&locale=zh_CN&withI18n=true&attributes=name&pageNo=1&pageSize=1'
```

Response Sample


```
{
  "msg": "OK",
  "code": 0,
  "pagination": {
    "pageNo": 1,
    "pageSize": 1,
    "totalSize": 1089
  },
  "data": [
    {
      "attributes": {
        "mdmType": "EnOS_Solar_Site",
        "modelId": "GDT_USCADA_inherit_EnOS_Solar_SITE_Generic",
        "timezone": "+08:00",
        "nameI18n": {
          "defaultValue": "GDT_性能测试光伏场站 285",
          "i18nValue": {
            "en_US": "GDT_性能测试光伏场站 285",
            "zh_CN": "GDT_性能测试光伏场站 285"
          }
```

```
      },
      "name": "GDT_性能测试光伏场站 285",
      "mdmPath": "/dTVde6bu/qpj41Ctz/00UrDtam",
      "rootModelId": "EnOS_Solar_Site",
      "modelIdPath":
"/EnOS_Solar_Site/EnOS_Solar_SITE_Generic/GDT_USCADA_inherit_EnOS
_Solar_SITE_Generic",
      "mdmId": "00UrDtam",
      "parentId": "qpj41Ctz"
    },
    "mdmId": "00UrDtam"
  }
 ],
 "traceId": "65ead229b5c7ce05e437a5d70c717821",
 "globalTraceId": "Ignored_Trace"
}
```


3.3 Query Asset Hierarchy

This API is used when the user wants to get hierarchy information of the specific asset.

3.3.1 Steps

1. To get the Site IDs, the user will have to Invoke this API. If the user wants to get the Device ID under a specific site, he/she will need to get the Site ID first before getting the Device ID.
2. The below table are the mandatory request parameters:

Request Parameters	**Data**
orgId	Provided by Univers Team

mdmIds	Provided by Univers Team
mdmTypes	Res_Solar_Site

3. Site IDs will be returned in the response, in parameter “**mdmId”.**

Example:

Request

```
curl  -X POST \
  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-
service/asset/v1.0/hierarchy' \
  --header 'Accept: */*' \
  --header 'User-Agent: Thunder Client (https://www.thunderclient.com)' \
  --form 'orgId="o16793658440861006"' \
  --form 'mdmIds="v8zxQ3BG"' \
  --form 'mdmTypes="Res_Solar_Site"' \
  --form 'attributes="name"' \
  --form 'pageNo="1"' \
  --form 'pageSize="1"'
```

Response

```
{
  "msg": "OK",
  "code": 0,
  "pagination": {
    "pageNo": 1,
    "pageSize": 1,
    "totalSize": 1986
  },
  "data": {
    "v8zxQ3BG": {
      "mdmObjects": {
        "Res_Solar_Site": [
          {
            "attributes": {
              "mdmType": "Res_Solar_Site",
              "modelId": "EnOS_Solar_RE_SITE",
```

```
            "timezone": "+08:00",
            "name": "Rebecca_site0581",
            "mdmPath": "/v8zxQ3BG/TmtBrEDL/Udfq6a47/039aJm4g",
            "rootModelId": "EnOS_Solar_Site",
            "modelIdPath": "/EnOS_Solar_Site/EnOS_Solar_RE_SITE",
            "mdmId": "039aJm4g",
            "parentId": "Udfq6a47"
          },
          "mdmId": "039aJm4g"
        }
      ]
    }
   }
  },
  "traceId": "65e1a71a4c3fb772136125be29ee794b",
  "globalTraceId": "Ignored_Trace"
}
```


4. After getting the Site IDs, the user will have to **invoke this API again** to get the Device IDs.
5. The below table are the mandatory request parameters:

Request Parameters	**Data**
orgId	Same as above, provided by Univers Team
mdmIds	Site IDs from the previous response
mdmTypes	Not mandatory, refer to below table

6. The user could also choose to fill in the **mdmTypes** identifier for the type of devices that he/she wants to query. Here is the list of mdmTypes:

Device Type	**mdmTypes**
Inverter	Res_Inverter
Dongle	Dongle

Storage	Res_Storage

7. Device IDs will be returned in the response, in parameter “**mdmId**”.

Example:

Request

```
curl  -X POST \
  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-
service/asset/v1.0/hierarchy' \
  --header 'Accept: */*' \
  --header 'User-Agent: Thunder Client (https://www.thunderclient.com)' \
  --form 'orgId="o16793658440861006"' \
  --form 'mdmIds="039aJm4g"' \
  --form 'attributes="name"' \
  --form 'pageNo="1"' \
  --form 'pageSize="1"'
```

Response


```
{
  "msg": "OK",
  "code": 0,
  "pagination": {
    "pageNo": 1,
    "pageSize": 1,
    "totalSize": 22
  },
  "data": {
    "039aJm4g": {
      "mdmObjects": {
        "Res_Storage": [
          {
            "attributes": {
              "mdmType": "Res_Storage",
              "modelId": "EnOS_Solar_RE_BS",
              "timezone": "+08:00",
              "mdmPath": "/v8zxQ3BG/TmtBrEDL/Udfq6a47/039aJm4g/2arCmagR"
,
              "modelIdPath": "/EnOS_Solar_BatteryStorage/EnOS_Solar_RE_BS",
```

```
            "parentId": "039aJm4g",
            "name": "Battery-1",
            "rootModelId": "EnOS_Solar_BatteryStorage",
            "mdmId": "2arCmagR"
          },
          "mdmId": "2arCmagR"
        }
      ]
    }
  }
 },
 "traceId": "65e1a7698179414a7538063f1d3533bd",
 "globalTraceId": "Ignored_Trace"
}
```


Refer to the below document for the specific request and response body:

3.3.2 Request Format

```
GET https://{api-gateway}/cds-asset-service/v1.0/hierarchy?action=query
```

3.3.3 Request Parameter

Name	Location	Mandatory/Optional	Data Type	Description
orgId	Query	Mandatory	String	The organization ID which the asset belongs to. **This will be provided by Univers Team.**
mdmIds	Query/Form	Mandatory	String	The object instance ID of the asset. Separate multiple IDs by commas. Up to 20000 object instances are allowed in a single query. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
mdmTypes	Query/Form	Optional	String	The object type ID which the asset belongs to. Separate multiple IDs by commas. Up to 100 object type IDs are allowed in a single query. All child hierarchies will be returned if *mdmTypes* is not set.
attributes	Query/Form	Optional	String	The attribute of the asset. Separate multiple attributes by commas. Both model attributes and “virtual attributes” defined in Common Data Service are supported.
locale	Query/Form	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.
withI18n	Query/Form	Optional	Boolean	Whether to return the internationalization content. The value is true or false. Default is false.

filter	Query/Form	Optional	String	Specify how to filter the returned data by attributes. For example, [[{"field":"field1","operator":">=","value":"1"},{"field":"field2","operator":"<=","value":"2"}],[{"field":"field3","operator":"==","value":"3"}]], which means the returned data is filtered by (field1 >= 1 and field2 <= 2) or (field3=3). If you specify the value of the name field, you can specify the value in the internationalized content. For example, [{"field":"name","operator":"==","value":"Solar_CombinerBox"}] and the parameter locale = en_US, which means the objects whose English name is Solar_CombinerBox will be returned.

3.3.4 Response Content Type

application/json; charset = UTF-8

3.3.5 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
data	Definitely	Asset Struct	Describe the asset information. See Query Accessible Asset.
pagination	Definitely	Pagination Struct	Describe the pagination information. See Pagination Struct.

3.3.5.1 Pagination Struct

Name	To Return Definitely/Conditionally	Data Type	Description
pageNo	Definitely	Integer	The number of page to be returned, starting from 1.
pageSize	Definitely	Integer	The number of the returned records on a single page.
totalSize	Definitely	Integer	The total number of the returned records.

3.4 Query Generic Meta Data

This API is used when the user wants to get all the related measurement points, attributes and metrics related to the specific asset.

3.4.1 Request Format

GET/POST https://{api-gateway}/cds-meta-service/v1.0/generic?action=query

3.4.2 Request Parameters

Name	Location	Mandatory /Optional	Data ptionalType	Description

orgId	Query	Mandatory	String	The organization ID which the generic data belongs to. **This will be provided by Univers Team.**
mdm-Types	Query/Form	Optional	String	The object type ID which the generic data belongs to. Separate multiple IDs by commas. Up to 100 object type IDs are allowed in a single query.
mdmIds	Query/Form	Optional	String	The object instance ID which the generic data belongs to. Separate multiple IDs by commas. Up to 20000 object instances are allowed in a single query. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
metaTyp	Query/Form	Optional	String	The type of the returned meta data. Use *measurement-point*, *attribute*, and *metric*. Separate multiple types by commas.
locale	Query/Form	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.
withI18n	Query/Form	Optional	Boolean	Whether to return the internationalization content. The value is true or false. Default is false.
withDataSourceInfo	Query/Form	Optional	Boolean	Whether to return the information of data source. The default value is false.
withElementGroupIn	Query/Form	Optional	Boolean	Whether to return the visualization group information. The default value is true.
withSource-Metric	Query	Optional	Boolean	Whether to return the source metric metadata. The default value is false. If true, ensure that the required source metrics are open for query.

Note: mdmTypes and mdmIds are both optional and you need to use at least one of them in a query. If both are used, mdmIds has a higher priority than mdmTypes.

3.4.3 Response Content Type

```
application/json; charset = UTF-8
```

3.4.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
attribute	Conditionally	AttributeMeta Struct	Describe the information of the attribute metadata.
measurementPoint	Conditionally	Measurement-PointMeta Struct	Describe the information of the measurement point metadata.

metric	Conditionally	MetricMeta Struct	Describe the information of the metric metadata.

3.4.5 Samples

Request Sample

```
curl  -X GET \

  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/meta/v1.0/generic?locale=en_US&orgId=o16793658440861006&mdmTypes=EnOS_Solar_ACCombinerBox'
```

Response Sample


```
{
  "msg": "OK",
  "code": 0,
  "data": {
    "attribute": [
      {
        "modelId": "EnOS_Solar_ACCombinerBox",
        "mdmType": "EnOS_Solar_ACCombinerBox",
        "attribute": "altitude",
        "name": "Altitude",
        "type": "DOUBLE",
        "units": "--",
        "source": "MODEL"
      }
    ],
    "measurementPoint": [
      {
        "modelId": "EnOS_Solar_ACCombinerBox",
        "mdmType": "EnOS_Solar_ACCombinerBox",
        "measurementPoint": "ACCBX.Ubc",
        "name": "Voltage Ubc",
        "type": "DOUBLE",
        "units": "V",
        "timeAggMethods": "avg,sum,max,min,first,last",
        "mdmAggMethods": "sum",
        "interval": "RAW,1m,5m,10m,15m,30m,60m",
        "signalType": "AI",
```

```
        "accumulable": false,
        "amcFlag": "0",
        "source": "MODEL"
      }
    ],
    "metric": [
      {
        "mdmType": "EnOS_Solar_ACCombinerBox",
        "metric": "WO.StatusClosed:TD",
        "name": "Number of Closed Work Orders for The Day",
        "type": "INT",
        "mdmAggMethods": "sum",
        "period": "TD",
        "paasMetric": "WO.StatusClosed",
        "amcFlag": "0",
        "dimensions": "workType,workOrderPriority",
        "standardType": "illegal",
        "sortable": false
      }
    ]
  },
  "traceId": "65ead3459dd0a77b4fb92351de62542f",
  "globalTraceId": "Ignored_Trace"
}
```


3.5 Query Record Meta Data

This API is used when the user wants to get a list of record datapoints.

3.5.1 Request Format

```
GET https://{api-gateway}/cds-meta-service/v1.0/record?action=query
```

3.5.2 Request Parameters

Name	Location	Mandatory/Optio	Data alType	Description

orgId	Query	Manda-tory	String	The organization ID which the record belongs to. **This will be provided by Univers Team.**
record-Types	Query	Optional	String	The record type ID which the record belongs to. Separate multiple IDs by commas. Up to 100 record types are allowed in a single query.
with-Schema	Query	Optional	Boole	nWhether to return the schema of the record.
locale	Query	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.
withI1	nQuery	Optional	Boole	nWhether to return the internationalization content. The value is true or false. Default is false.

3.5.3 Response Content Type

application/json; charset = UTF-8

3.5.4 Response Parameters

Name	To Return Defi-nitely/Conditionally	Data Type	Description
recordType	Definitely	String	The identifier of the record type.
name	Definitely	String	The name of the record type in the corresponding request language.
nameI18n	Conditionally	I18n Struct	Describe the internalization content of the record type name.
references	Conditionally	RecordReference Struct	Describe the associated parent record type.
schema	Definitely	RecordField Struct	Describe the field information of the record type.

3.5.4.1 I18n Struct

Name	To Return Definitely/Conditionally	Data Type	Description
defaultValue	Definitely	String	The default content.
en_US	Conditionally	String	The English content.
zh_CN	Conditionally	String	The Chinese content.
es_ES	Conditionally	String	The Spanish content.
ja_JP	Conditionally	String	The Japanese content.

3.5.4.2 RecordReference Struct

Name	To Return Defi-nitely/Conditionally	Data Type	Description
record-Type	Definitely	String	The associated parent record type.
for-eignKeys	Definitely	Map (The Key and Value are of the String type)	Describe the field information of the parent record type.

3.5.4.3 RecordField Struct

Name	To Return Definitely/Conditionally	Data Type	Description
field	Definitely	String	The identifier of the record field.
name	Definitely	String	The name of the record field in the corresponding request language.
nameI18n	Conditionally	I18n Struct	Describe the internalization content of the record field name.
description	Conditionally	String	The description of the record field in the corresponding request language.
descriptionI18n	Conditionally	I18n Struct	Describe the internalization content of the record field description.
isI18n	Definitely	Boolean	Whether the field content is I18n Struct.
dataType	Definitely	String	The data type of the field.
units	Conditionally	String	The unit of the field.
sortable	Definitely	Boolean	Whether the field is sortable.
filters	Conditionally	List (The Value is of the String type)	The supported filters of the field.
expression	Conditionally	String	The expression of the field.
enumerate	Conditionally	Enumerate Struct	Describe the enumeration values of the enumerated field.
isSubRecord-Type	Conditionally	Boolean	Whether the field is associated with a child record type.
subRecordFields	Conditionally	String	The fields of the associated child record type.

3.5.4.4 Enumerate Struct

Name	To Return Definitely/Conditionally	Data Type	Description
name	Definitely	String	The name of the enumeration values in the corresponding request language.
nameI18n	Conditionally	I18n Struct	Describe the internalization content of the enumeration values.

3.5.5 Samples

Request

```
curl  -X GET \

  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/meta/v1.0/record?locale=zh-CN&recordTypes=ResCity&orgId=o16793658440861006&withSchema=true'
```

Response


```
{
  "msg": "OK",
  "code": 0,
  "data": [
    {
      "recordType": "ResCity",
      "name": "城市（户用光伏）",
      "schema": [
        {
          "field": "country",
          "name": "关联国家编号",
          "isI18n": false,
          "dataType": "String",
          "units": "--",
          "sortable": false,
          "filters": [
            "=="
          ],
          "expression": "country",
          "isAsset": false,
          "isSubRecordType": false
        },
        {
```

```
    "field": "province_id",
    "name": "关联省份编号",
    "isI18n": false,
    "dataType": "String",
    "sortable": false,
    "filters": [
      "=="
    ],
    "expression": "province_id",
    "isAsset": false,
    "isSubRecordType": false
  },
  {
    "field": "latitude",
    "name": "纬度",
    "isI18n": false,
    "dataType": "Double",
    "units": "--",
    "sortable": false,
    "filters": [],
    "expression": "latitude",
    "isAsset": false,
    "isSubRecordType": false
  },
  {
```

```
    "field": "name",
    "name": "名称",
    "isI18n": false,
    "dataType": "String",
    "units": "--",
    "sortable": false,
    "filters": [],
    "expression": "name_i18n",
    "isAsset": false,
    "isSubRecordType": false
  },
  {
    "field": "id",
    "name": "城市 ID",
    "isI18n": false,
    "dataType": "String",
    "units": "--",
    "sortable": false,
    "filters": [
      "in"
    ],
    "expression": "key",
    "isAsset": false,
    "isSubRecordType": false
  },
```

```
      {
        "field": "longitude",
        "name": "经度",
        "isI18n": false,
        "dataType": "Double",
        "units": "--",
        "sortable": false,
        "filters": [],
        "expression": "longitude",
        "isAsset": false,
        "isSubRecordType": false
      }
    ]
  }
 ],
 "traceId": "65ead3e29043dbba0336bed1a83f81f4",
 "globalTraceId": "Ignored_Trace"
}
```


3.6 Query Record Data

This API is used when the user wants to get the record data.

3.6.1 Request Format

```
POST https://{api-gateway}/cds-record-service/v1.0/record?action=query
```

3.6.2 Request Parameters

Name	Location	Mandatory/Optional	Data Type	Description
orgId	Query	Mandatory	String	The organization ID which the record belongs to. **This will be provided by Univers Team.**
locale	Query	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.
recordTypes	Body	Mandatory	String	The record type ID which the record belongs to. Separate multiple IDs by commas. Up to 100 record types are allowed in a single query.
fields	Body	Mandatory	String	The field of the record. Separate multiple fields by commas.
filter	Body	Optional	String	Specify how to filter the returned data by record fields. Forexample, [[{"field":"field1","operator":">=","value":"1"},{"field":"field2","operator":":"2"}],[{"field" which means the returned data is filtered by (field1 >= 1 an or (field3=3).
orderBy	Body	Optional	String	Specify how to sort the returned data by record fields. Forexample, [{"field":"field1","order":"ASC"}, {"field":"field2","order":"DESC"}], which means the returned data is sorted first by field1 in ascending order and then by field2 in descending order.
pageSize	Body	Optional	Integer	The number of the returned records on a single page. The default value is 100.
pageNo	Body	Optional	Integer	The number of page to be returned. The default value is 1.

3.6.3 Response Content Type

application/json; charset = UTF-8

3.6.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
recordType	Definitely	String	The record type.
recordFields	Definitely	Object	The fields of the record.
pagination	Definitely	Pagination Struct	Describe the pagination information.

3.6.4.1 Pagination Struct

Name	To Return Definitely/Conditionally	Data Type	Description

pageNo	Definitely	Integer	The number of page to be returned, starting from 1.
pageSize	Definitely	Integer	The number of the returned records on a single page.
totalSize	Definitely	Integer	The total number of the returned records.

3.6.5 Samples

Request

```
curl --location 'https://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/record/v1.0/record?locale=en_US&orgId=o16793658440861006' \
--header 'Content-Type: application/json;charset=UTF-8' \
--data '{
  "pageNo": 1,
  "recordTypes": "ResCity",
  "pageSize": 1,
  "fields": "id,name,country,province_id"
}'
```

Response

```
{
    "msg": "OK",
    "code": 0,
    "pagination": {
        "pageNo": 1,
        "pageSize": 1,
        "totalSize": 1665
    },
    "data": [
        {
```

```
            "country": "2077456",
            "province_id": "2177478",
            "recordType": "ResCity",
            "name": "Coree",
            "id": "10177097"
        }
    ],
    "traceId": "65ead5b7ca261e45c177a56f8ef47f08",
    "globalTraceId": "Ignored_Trace"
}
```


3.7Query Real-Time Measurement Point Data

This API is used when the user wants to get the latest reading of a measurement point of the specific asset.

3.7.1 Request Format

```
GET/POST https://{api-gateway}/cds-realtime-service/v1.0/measurement-point/latest?action=query
```

3.7.2 Request Parameters

Name	Location	Mandatory/Optional	DataType	
orgId	Query	Mandatory	String	The organization ID which the record belongs to. **This will be provided by Univers Team.**
mdmIds	Query/Form	Mandatory	String	The object instance ID which the measurement point belongs to. Separate multiple IDs by commas. Up to 20000 object instances are allowed in a single query. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
pointIds	Query/Form	Mandatory	String	The measurement point ID. Separate multiple IDs by commas. Up to 100 points are allowed in a single query.
mdmTypes	Query/Form	Optional	Boolean	Specify how to filter the returned data by the object type that a child asset belongs to. Support specifying only one object type identifier.
filter	Query/Form	Optional	String	Specify how to filter the returned data by pointIds and attributes. If you specify the field that comes from attributes, the prefix A:: is required, otherwise the field come from pointIds by default. For example, [[{"field":"A::field1","operator":">=","value":"1"},{"field":"A::field2","op","value":"2"}],[{"fi which means the returned data is filtered by (fiel field2 <= 2) or (field3=3), among where field1 and field1 come from attri comes from pointIds.
orderBy	Query/Form	Optional	String	Specify how to sort the returned data by pointIds and attributes. If you specify the field that comes from attributes, the prefix A:: is required, otherwise the field come from pointIds by default. For example, [{"field":"A::field1","order":"ASC"}, {"field":"field2","order":"DESC"}], which means the returned data is sorted first by field1 in ascending order and then by field2 in descending order, among where field1 comes from attributes, field2 comes from pointIds.
pageSize	Query/Form	Optional	Integer	The number of the returned records on a single page. The maximum number is 20000.
pageNo	Query/Form	Optional	Integer	The number of page to be returned, starting from 1.

3.7.3 Response Content Type

application/json; charset = UTF-8

3.7.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
data	Definitely	PointValue Struct	Describe the details of the point.
pagination	Definitely	Pagination Struct	Describe the pagination information.

Chapter 4. Real-Time Data

3.7.4.1 PointValue Struct

Name	To Return Definitely/Conditionally	Data Type	Description
value	Definitely	Integer/Double/String	The value of the measurement point.
timestamp	Definitely	Long	The latest data timestamp (UNIX time).
localtime	Definitely	String	The latest data timestamp in local time format.
attributes	Conditionally	Object	Describe the attributes of the measurement point.

3.7.4.2 Pagination Struct

Name	To Return Definitely/Conditionally	Data Type	Description
pageNo	Definitely	Integer	The number of page to be returned, starting from 1.
pageSize	Definitely	Integer	The number of the returned records on a single page.
totalSize	Definitely	Integer	The total number of the returned records.

3.7.5 Samples

Request

```
curl  -X POST \
  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/realtime/v1.0/measurement-point/latest' \
  --form 'orgId="o16227961710541858"' \
  --form 'mdmIds="V4dym2yu"' \
  --form 'pointIds="WTUR.GenDetailState_test"' \
  --form 'mdmTypes="EnOS_Wind_Turbine"'
```

Response


```
{
  "msg": "OK",
  "subMsg": "warning: the maximum responded pageSize would be 20000 due to no pageSize passed",
  "code": 0,
  "pagination": {
    "pageNo": 1,
    "pageSize": 20000,
    "totalSize": 2
  },
  "data": {
    "7HvmJefE": {
      "points": {
        "WTUR.GenDetailState_test": {
          "value": 0,
          "timestamp": 1699297299340,
          "localtime": "2023-11-07 03:01:39",
          "attributes": {}
        }
      }
    },
    "EtBELO21": {
      "points": {
        "WTUR.GenDetailState_test": {
```

```
        "value": 0,
        "timestamp": 1699297299439,
        "localtime": "2023-11-07 03:01:39",
        "attributes": {}
      }
    }
  }
 },
 "traceId": "65ead63f6446c18b3efb5412278f8d47",
 "globalTraceId": "Ignored_Trace"
}
```


3.8 Query Historical Measurement Point Data

This API is used when the user wants to get the historical data of a measurement point of the specific asset.

3.8.1 Request Format

```
GET/POST https://{api-gateway}/cds-timeseries-service/v1.0/tsdb-detail?action=query
```

3.8.2 Request Parameters

Name	Location	Mandatory /Optional	Data Type	Description
orgId	Query	Mandatory	String	The organization ID which the measurement point belongs to. **This will be provided by Univers Team.**
mdmIds	Query/Form	Mandatory	String	The object instance ID which the measurement point belongs to. Separate multiple IDs by commas. Up to 20000 object instances are allowed in a single query. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
pointIdsWithLogic	Query/Form	Mandatory	String	The measurement point ID with aggregation logic. Format: *Function(pointId)*. Separate multiple IDs by commas, for example, *sum(pointId1),sum(pointId2)*. Up to 100 measurement points are allowed in a single query. The supported aggregation calculation methods include count, avg, sum, max, min, first, last. The time range for the aggregation query is *[startTime,endTime)*, that is, the aggregation operand contains the data at the time of "startTime", but does not contain the data at the time of "endTime".
startTime	Query/Form	Mandatory	String	The start time of the sampling data. Use this format when querying data in local time: *yyyy-MM-dd HH:mm:ss*; use this format when querying data in UTC time: *yyyy-MMddTHH:mm:ssZ*. For local time format, Common Data Service queries the data by the local time of where each asset is located.
endTime	Query/Form	Mandatory	String	The end time of the sampling data. Its format must be consistent with "startTime". Make sure the number of days between "startTime" and "endTime" is not greater than 90.
interval	Query/Form	Mandatory	Integer	The time granularity by which the measurement point is aggregated. The following intervals are supported: RAW (raw data), 1m (1 minute), 5m (5 minutes), 10m (10 minutes), 15m (15 minutes), 30m (30 minutes), H (hour). Make sure the calculated value of this formula is not greater than 12000: *(endTime-startTime) / interval*, that is the number of the designated time granularity between "startTime" and "endTime" is not greater than 12000.
pageSize	Query/Form	Optional	Integer	The number of the returned records on a single page for a single measurement point of a single device. Make sure the calculated value of this formula is not greater than 120000: *mdmIds * pointIdsWithLogic * pageSize*.
autoInterpolate	Query/Form	Optional	Boolean	Whether to return the latest data in the past if no data is found. The default value is false.
withQuality	Query/Form	Optional	Boolean	Whether to return the data quality tag. The default value is false.

3.8.3 Response Content Type

application/json; charset = UTF-8

3.8.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
mdmId	Definitely	String	The object instance that the point belongs to. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
timestamp	Definitely	Long	The data timestamp (UNIX time).
localtime	Definitely	String	The data timestamp in local time format.
point	Definitely	Object	Describe the time-series values of the measurement point.

3.8.5 Samples

Request

```
curl  -X GET \

  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/timeseries/v1.0/tsdb-detail?orgId=o16227961710541858&mdmIds=3r2MDPNa%2Cj8lfDdki&pointIdsWithLogic=GenActivePW&startTime=2024-01-21%2013%3A05%3A05&endTime=2024-01-21%2014%3A16%3A05&interval=5&autoInterpolate=true'
```

Response

```
{

  "msg": "OK",

  "code": 0,

  "data": {

    "items": [

      {
```

```
      "localtime": "2024-01-21 14:00:00",
      "GenActivePW": 40.0574231577778,
      "mdmId": "j8lfDdki",
      "timestamp": 1705842000000
    },
    {
      "localtime": "2024-01-21 14:05:00",
      "GenActivePW": 40.0574231577778,
      "mdmId": "j8lfDdki",
      "timestamp": 1705842300000
    },
    {
      "localtime": "2024-01-21 14:10:00",
      "GenActivePW": 40.0574231577778,
      "mdmId": "j8lfDdki",
      "timestamp": 1705842600000
    },
    {
      "localtime": "2024-01-21 14:15:00",
      "GenActivePW": 40.0574231577778,
      "mdmId": "j8lfDdki",
      "timestamp": 1705842900000
    }
  ]
},
"traceId": "65ead72935d223a2c24d84b4007d24dd",
```

```
  "globalTraceId": "Ignored_Trace"
}
```

3.9 Query Real-Time Metric Data

This API is used when the user wants to get the latest reading of a metric of the specific asset.

3.9.1 Request Format

```
GET/POST https://{api-gateway}/cds-realtime-service/v1.0/metric/latest?action=query
```

3.9.2 Request Parameters

Name	Location	Mandatory/Optional	Data Type	Description
orgId	Quer	Mandatory	Strin	The organization ID which the metric belongs to. **This will be provided by Univers Team.**
mdmIds	Query/Form	Mandatory	Strin	The object instance ID which the metric belongs to. Separate multiple IDs by commas. Up to 20000 object instances are allowed in a single query. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
metrics	Query/Form	Mandatory	String	The metric ID. Separate multiple IDs by commas. Up to 100 metrics are allowed in a single query.
dimensions	Query/Form	Optional	String	The dimension other than asset and time, such as device type and device manufacturer. This parameter is used to aggregate or filter the returned data. Separate multiple dimensions by commas. Up to 10 dimensions are allowed in a single query.
rollup	Query/Form	Optional	Boolean	Whether to roll up data for queries with additional dimensions.
rollupDimensions	Query/Form	Optional	String	The rollup dimensions. If not specified, the value is set to the value of the *dimensions* parameter.
withDimensionName	Query/Form	Optional	Boolean	Whether to include the dimension name when returning a dimension ID.
locale	Query/Form	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.

mdmTypes	Query/Form	Optional	Boolean	Specify how to filter the returned data by the object type that a child asset belongs to. Support specifying only one object type identifier.
filter	Query/Form	Optional	String	Specify how to filter the returned data by metrics or dimensions. For example, [[{“field”:”field1”,”operator”:”>=”,”value”:”1”},{“field”:”field2”,”o =”,”value”:”2”}],[{“fiel which means the returned data is filtered 1 and field2 <= 2) or (field3=3).
orderBy	Query/Form	Optional	String	Specify how to sort the returned data by metrics or dimensions. For example, [{“field”:”field1”,”order”:”ASC”}, {“field”:”field2”,”order”:”DESC”}], which means the returned data is sorted first by field1 in ascending order and then by field2 in descending order.
pageSize	Query/Form	Optional	Integer	The number of the returned records on a single page. The maximum number is 20000.
pageNo	Query/Form	Optional	Integer	The number of page to be returned, starting from 1.

3.9.3 Response Content Type

application/json; charset = UTF-8

3.9.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
data	Definitely	LatestMetric Struct	Describe the details of the metric.
pagination	Definitely	Pagination Struct	Describe the pagination information.

3.9.4.1 LatestMetric Struct

Name	To Return Definitely/Conditionally	Data Type	Description
metrics	Conditionally	MetricValue Struct	Describe the real-time values of the metric.
metricsWith-Dimensions	Conditionally	MetricWithDimension Struct	Describe the real-time values of the metric with dimensions.

3.9.4.2 MetricValue Struct

Name	To Return Definitely/Conditionally	Data Type	Description

value	Definitely	Integer/Double/String	The values of the metric.
localtime	Definitely	String	The corresponding data timestamp in local time format.

3.9.4.3 MetricWithDimension Struct

Name	To Return Definitely/Conditionally	Data Type	Description
dimension	Conditionally	Object	Describe the dimension information of the metric.
metrics	Definitely	MetricValue Struct	Describe the real-time values of the metric.

3.9.4.4 Pagination Struct

Name	To Return Definitely/Conditionally	Data Type	Description
pageNo	Definitely	Integer	The number of page to be returned, starting from 1.
pageSize	Definitely	Integer	The number of the returned records on a single page.
totalSize	Definitely	Integer	The total number of the returned records.

3.9.5 Samples

Request

```
curl  -X POST \
  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/realtime/v1.0/metric/latest' \
  --form 'orgId="o16793658440861006"' \
  --form 'mdmIds="5zLS3PBv,nX0mW7H2"' \
  --form 'metrics="ActiveProduction:BOL"' \
  --form 'mdmTypes="Res_Inverter"' \
  --form 'pageNo="1"' \
  --form 'pageSize="1"'
```

Response

```
{
```

```
  "msg": "OK",
  "code": 0,
  "pagination": {
    "pageNo": 1,
    "pageSize": 1,
    "totalSize": 1121
  },
  "data": {
    "01MUVZ3i": {
      "metrics": {
        "ActiveProduction:BOL": {
          "value": 0.40261,
          "localtime": "1970"
        }
      }
    }
  },
  "traceId": "65ead7c33d483bd18687e5ee8d4ed0c9",
  "globalTraceId": "Ignored_Trace"
}
```


3.10 Query Historical Metric Data

This API is used when the user wants to get the historical data of a metric of the specific asset.

3.10.1 Request Format

GET/POST https://{api-gateway}/cds-metric-service/v1.0/metric?action=query

3.10.2 Request Parameters

Name	Location	Mandatory/Optional	Data Type	Description
orgId	Query	Mandatory	String	The organization ID which the metric belongs to. **This will be provided by Univers Team.**
mdmIds	Query/Form	Mandatory	String	The object instance ID which the metric belongs to. Separate multiple IDs by commas. Up to 20000 object instances are allowed in a single query. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query. Format: *mdmId1,mdmId2,mdmId3,mdmId4*; format with aggregation groups: *mdmId1,mdmId2:group1|mdmId3,mdmId4:group2*.
metrics	Query/Form	Mandatory	String	The metric ID. Separate multiple IDs by commas. Up to 100 metrics are allowed in a single query.
startTime	Query/Form	Mandatory	String	The start time of the sampling data. Format: *yyyy-MM-dd HH:mm:ss*. Common Data Service queries the data by the local time of where each asset is located.
endTime	Query/Form	Mandatory	String	The end time of the sampling data. Its format must be consistent with “startTime”. Make sure the number of days between “startTime” and “endTime” is not greater than 4000.
timeGroup	Query/Form	Mandatory	String	The time granularity by which the metric is aggregated. The following granularity are supported: 1m (1 minute), 5m (5 minutes), 10m (10 minutes), 15m (15 minutes), 30m (30 minutes), H (hour), D (day), W (week), M (month), Y (year), T (total). Make sure the calculated value of this formula is not greater than specified range: *(endTimestartTime) / timeGroup*, that is the number of the designated time granularity between “startTime” and “endTime” is not greater than specified range. The specified range of 1m/5m/10m/15m/30m is 2880, the specified range of H is 8784, and the specified range of D/W/M/Y is 576.
preserveIndex	Query/Form	Optional	Boolean	Whether to preserve the index (non-metric data such as mdmId and time). The default value is false.
dimensions	Query/Form	Optional	String	The dimension other than asset and time, such as device type and device manufacturer. This parameter is used to aggregate or filter the returned data. Separate multiple dimensions by commas. Up to 10 dimensions are allowed in a single query.
rollup	Query/Form	Optional	Boolean	Whether to roll up data for queries by multiple dimensions.
rollupDimensions	Query/Form	Optional	String	The rollup dimension for queries by multiple dimensions.
withDimensionName	Query/Form	Optional	Boolean	Whether to include the dimension name when returning a dimension ID.
locale	Query/Form	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.

filter	Query/Form	Optional	String	Specify how to filter the returned data by metrics or dimensions. For example, [[{"field":"field1","operator":">=","value":"1"},{"field":"field2","which means the returned data is filtered by (field1 >= 1 and fi (field3=3).
orderBy	Query/Form	Optional	String	Specify how to sort the returned data by metrics or dimensions. For example, [{"field":"field1","order":"ASC"}, {"field":"field2","order":"DESC"}], which means the returned data is sorted first by field1 in ascending order and then by field2 in descending order.
pageSize	Query/Form	Optional	Integer	The number of the returned records on a single page. The maximum number is 20000.
pageNo	Query/Form	Optional	Integer	The number of page to be returned, starting from 1
mdmTypes	Query/Form	Optional	String	The object type ID which the metric belongs to. This parameter is used to filter the object instances to be queried.
virtualDimensions	Query/Form	Optional	String	Specify a self-defined dimension to replace

3.10.3 Response Content Type

application/json; charset = UTF-8

3.10.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
mdmId	Definitely	String	The object instance that the metric belongs to. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
time	Definitely	String	The data timestamp in local time format.
metric	Definitely	Object	Describe the time-series values of the metric.
dimension	Conditionally	Object	Describe the dimension information of the metric.
pagination	Definitely	Pagination Struct	Describe the pagination information.

3.10.4.1 Pagination Struct

Name	To Return Definitely/Conditionally	Data Type	Description
pageNo	Definitely	Integer	The number of page to be returned, starting from 1.
pageSize	Definitely	Integer	The number of the returned records on a single page.
totalSize	Definitely	Integer	The total number of the returned records.

3.10.5 Samples

Request

```
curl  -X GET \
  'https://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/metric/v1.0/metric?orgId=o16793658440861006&startTime=2024-01-01%2000%3A00%3A00&metrics=RevenueWithUnit&endTime=2024-01-01%2001%3A00%3A00&mdmIds=WCacpy1e&timeGroup=H&pageSize=20000'
```

Response


```
{
  "msg": "OK",
  "code": 0,
  "pagination": {
    "pageNo": 1,
    "pageSize": 20000,
    "totalSize": 2
  },
  "data": [
    {
      "RevenueWithUnit": "0.0 CNY",
      "time": "2024-01-01 00:00:00",
      "mdmId": "WCacpy1e"
    },
    {
      "RevenueWithUnit": "0.0 CNY",
      "time": "2024-01-01 01:00:00",
```

```
    "mdmId": "WCacpy1e"
   }
  ],
  "traceId": "65ead9223411293a0135a31c2c1b17f3",
  "globalTraceId": "Ignored_Trace"
}
```


3.11 Query Asset Attribute Data

This API is used when the user wants to get attribute data of the specific asset.

3.11.1 Request Format

```
GET/POST https://{api-gateway}/cds-asset-service/v1.0/attribute?action=query
```

3.11.2 Request Parameters

Name	Location	Mandatory/Optional	Data Type	Description
orgId	Query	Mandatory	String	The organization ID which the attribute belongs to. **This will be provided by Univers Team.**
mdmIds	Query/Form	Mandatory	String	The object instance ID of the asset. Separate multiple IDs by commas. Up to 20000 object instances are allowed in a single query. To ensure query performance, it is recommended that you pass in no more than 100 object instances in a single query.
attributes	Query/Form	Optional	String	The attribute ID of the asset. Separate multiple IDs by commas. Both model attributes and "virtual attributes" defined in Common Data Service are supported.
locale	Query/Form	Optional	String	Use *zh-CN*, *en-US*, *ja-JP*, or *es-ES*. If not specified, the value is set to *en_US* by default.
withI18n	Query/Form	Optional	Boolean	Whether to return the internationalization content. The value is true or false. Default is false.
filter	Query/Form	Optional	String	Specify how to filter the returned data by attributes. Forexample, [[{"field":"field1","operator":">=","value":"1"},{"field":"field2","operator":"2"}],[{"field" which means the returned data is filtered by (field1 >= <= 2) or (field3=3).
orderBy	Query/Form	Optional	String	Specify how to sort the returned data by attributes. Forexample, [{"field":"field1","order":"ASC"}, {"field":"field2","order":"DESC"}], which means the returned data is sorted first by field1 in ascending order and then by field2 in descending order.
pageSize	Query/Form	Optional	Integer	The number of the returned records on a single page. The maximum number is 20000.
pageNo	Query/Form	Optional	Integer	The number of page to be returned, starting from 1.

3.11.3 Response Content Type

application/json; charset = UTF-8

3.11.4 Response Parameters

Name	To Return Definitely/Conditionally	Data Type	Description
data	Definitely	Attribute Struct	Describe the attributes of the asset.
pagination	Definitely	Pagination Struct	Describe the pagination information.

3.11.4.1 Pagination Struct

Name	To Return Definitely/Conditionally	Data Type	Description
pageNo	Definitely	Integer	The number of page to be returned, starting from 1.
pageSize	Definitely	Integer	The number of the returned records on a single page.
totalSize	Definitely	Integer	The total number of the returned records.

3.11.5 Samples

Request

```
curl  -X GET \
  'http://ors-core-unified-service.apaas-pdc1.eniot.io/cds-service/asset/v1.0/attribute?orgId=o15891646475831&mdmIds=193f25993c226000&attributes=name%2Cs_city&withI18n=false&locale=zh-CN'
```

Response

```
{
  "msg": "OK",
  "code": 0,
  "pagination": {
    "pageNo": 1,
    "pageSize": 20000,
    "totalSize": 1
  },
  "data": {
    "193f25993c226000": {
      "s_city": "东台市",
      "mdmType": "EnOS_Solar_Site",
      "modelId": "EnOS_Solar_SITE_Generic",
```

```
    "timezone": "-03:00",
    "name": "Lapine",
    "rootModelId": "EnOS_Solar_Site",
    "modelIdPath": "/EnOS_Solar_Site/EnOS_Solar_SITE_Generic",
    "mdmId": "193f25993c226000"
   }
  },
  "traceId": "65ead9d4357e975097bf20cb1439ec1d",
  "globalTraceId": "Ignored_Trace"
}
```


3.12 Send Control Command

This API is used to send control command to the device/s.

1. The below table are the mandatory request parameters:

Request Parameters	**Array of AssetIdPointIdGroup**	**Data**
controlList	controlAssetId	Device ID from the Query Accessible Asset API's response
	value	Refer to **'Device Control Points.xlsx'** to get the value, serviceType, controlPointId for the point to be controlled for each type of devices. *value and serviceType parameter data will be provided in the next version.
	serviceType	
	controlPointId	
commandType	-	batch

2. Refer to the below document for request and response body details.

3.12.1 Request format

POST https://{apigw-address}/fleetcontrol-service/{version}/services?action=normalControl

3.12.2 Request parameters(URI)

Name	Location (Path/Query)	Mandatory/Optional	Data Type	Description
orgId	Query	Mandatory	String	The organization ID

3.12.3 Request Parameters (Body)

Name	Mandatory/Optional	Data Type	Description
controlList	Mandatory	Array of AssetIdPointIdGroup	control list
commandType	Mandatory	String	reserved items, just set commandType to batch
operator	Optional	String	operator
source	Mandatory	String	AccessKey of caller app

3.12.4 AssetIdPointIdGroup

Name	Mandatory/Optional	Data Type	Description

<table>
<tr>
<td>value</td>
<td>Mandatory</td>
<td>Integer/Double(depending on serviceType)</td>
<td>Control value.
<table>
<tr><th>serviceType</th><th>DataType</th></tr>
<tr><td>opModConnect</td><td>Integer</td></tr>
<tr><td>opModEnergize</td><td>Integer</td></tr>
<tr><td>opModReset</td><td>Integer</td></tr>
<tr><td>opModMaxLimW</td><td>Double</td></tr>
<tr><td>setGradW</td><td>Double</td></tr>
<tr><td>setMaxChargeRateW</td><td>Double</td></tr>
<tr><td>setMaxDischargeRateW</td><td>Double</td></tr>
<tr><td>opModTargetW</td><td>Double</td></tr>
<tr><td>opModTargetVar</td><td>Double</td></tr>
<tr><td>opModFixedW</td><td>Integer</td></tr>
<tr><td>opModFixedVar</td><td>Integer</td></tr>
</table>
</td>
</tr>
</table>

			<table><tr><td>opModOperationalMode</td><td>Integer</td></tr><tr><td>setSystemTime</td><td>Integer</td></tr><tr><td>opModFixedPFW</td><td>Double</td></tr><tr><td>setIntegerParameter</td><td>Integer</td></tr><tr><td>setFloatParameter</td><td>Double</td></tr><tr><td>setStringParameter</td><td>String</td></tr></table>
controlAssetId	Mandatory	String	The assetId of the device to be controlled, length range [1,60].
controlPointId	Mandatory	String	The pointId of the device to be controlled, length range [1,60].
feedbackPointId	Optional	String	The pointId of the check point, the length range is [0,60]. The fleet control will record the value of feedbackPointId before each control is executed. When the feedbackCheck is true, it needs to wait until the value of the feedbackPointId is equal to the control value before the control is considered successful.

feedbackCheck	Optional	Boolean	false: If the control api of DCM returns successfully, it is considered successful, and the value of feedbackPointId is not verified. true: When the feedbackPointId is not empty, the control is considered successful until the value of the feedbackPointId is equal to the control value. The control cycle will be longer and the performance is not high, but it will be more accurate. default false.
timeZone	Mandatory	String	Time zone, the time zone of the controlled device, there are two formats: +08:00, Asia/Shanghai, length range [1,60].
duration	Mandatory	Integer	Control valid time (unit: second), range [1,60].

serviceType	Mandatory	String	Control type. The following values are valid: opModConnect opModEnergize opModReset opModMaxLimW setGradW setMaxChargeRateW setMaxDischargeRateW opModTargetW opModTargetVar opModFixedW opModFixedVar opModOperationalMode setSystemTime opModFixedPFW setIntegerParameter setFloatParameter setStringParameter

3.12.5 Response Parameters

Name	Data Type	Description
code	Integer	return code
msg	String	return message
requestId	String	request ID
data	ServiceResponseData	detail data of response

3.12.6 ServiceResponseData

Name	Data Type	Description
commandId	String	command ID
subCommandIds	Array of String	A list of subcommand IDs (including success and failure, corresponding to the order of the array in the request)
errs	Map，key is subCommandId，value is LogFlow	Those subcommands that have errors, such as being rejected due to priority issues, operating middleware failures, etc.

3.12.7 LogFlow

Name	Data Type	Description
t	Long	UTC milliseconds
action	String	The code of the action that occurred
data	Different action structures are different	Some details related to action

Action in LogFlow	Data in the LogFlow	Description
400001	null	Requested action succeeded
400002	null	Rejected Due to Higher Priority

Action in LogFlow	Data in the LogFlow	Description
400003	Integer, The number of assetIds being scheduled	Rejected Due to Too Many Control Asset
400004	Integer, queue length	Rejected Due to Dispatch Queue Full
400005	Map, the key is the code and msg in the response	Failed Due to Invoke Platform Service
400006	null	Aborted Due to Duration Expired
400007	The feedbackpoint value at the end of validation	Aborted Due to Invalid Feedback Point
400008	String, some brief notes	Aborted Due to Internal Program Exception
400009	null	Rejected Due to New Same Request
400010	String, error message	Failed Due to Feedback Point Query
400011	String, error message	Failed Due to Abnormal Return Value of Platform Service
400012	null	Rejected Due to Exceeding the Maximum Control Point Limit
400013	null	Rejected Execution of the Persistent Request Due to Higher Priority
400014	null	Rejected Due to Instant Request DOES NOT Support Cancel

Action in LogFlow	Data in the LogFlow	Description
400101	null	Aborted Due to Duration Expired by Edge device
400102	String, some brief notes	Aborted Due to Check Failure Before Sending Control Request by Edge device
400201	null	Aborted Due to Duration Expired by Edge Command Service
400202	String, some brief notes	Aborted Due to Check Failure Before Sending Control Request by Edge Command Service
400301	null	Aborted Due to Duration Expired by Edge Device Service
400302	null	Failed Due to Device Reject Request by Edge Device Service
400303	String, some brief notes	Aborted Due to Check Failure Before Control by Edge Device Service

3.12.8 Error Codes

Code	Description
10001	internal error
10002	unsupported action

Code	Description
10003	orgId is illegal
10004	request body is illegal
10005	assetId is illegal
10006	serviceType or ruleIds is illegal
10007	detail is illegal
10008	subCommandId is illegal
10009	commandId is illegal
10010	pointId is illegal
10011	no result
10012	operator is illegal

3.12.9 Samples

3.12.9.1 Request Sample

```
POST https://{apigw-address}/fleetcontrol-
service/{version}/services?action=normalControl&orgId=yourOrgId

requestBody:

{
```

```
"controlList":
[
  {
    "serviceType":"opModConnect",
    "value":1,
    "controlAssetId":"assetId1",
    "controlPointId":"pointId1",
       "feedbackPointId":"pointId1",
    "feedbackCheck": false,
    "timeZone":"+08:00",
    "duration":60
  },
  {
    "serviceType":"opModConnect",
    "value":0,
    "controlAssetId":"assetId2",
    "controlPointId":"pointId2",
       "feedbackPointId":"pointId2",
    "feedbackCheck": false,
    "timeZone":"+08:00",
    "duration":60
  }
],
"commandType":"batch",
"operator":"admin",
```

```
  "source":"f13a8249-562a-43b9de6b99d8-acfb-42fc"
}
```

3.12.9.2 Return Sample

```
{
  "code":0,
  "msg":"OK",
  "requestId":"7d863d517eae4f18a2776452eb1305bb",
  "data":{
      "commandId":"2078724684846989312",
      "subCommandIds":["2078724684846989313","2078724684846989314"],
      "errs":null
  }
}
```

3.12.9.3 Return Sample(contains errors)

```
{
    "code":0,
    "msg":"OK",
    "requestId":"7d863d517eae4f18a2776452eb1305bb",
    "data":{
        "commandId":"2078724684846989312",
        "subCommandIds":["2078724684846989313","2078724684846989314"],
        "errs":{
```

```
            "2078724684846989314": {
                "t": 1634610917013,
                "action": "400002",
                "data": "2078724684846989312"
            }
        }
    }
}
```


4 Appendix

If the user could not open the above links, please find the below documents attached together in the email.

4.1 Invoke API Through Access Token

You can follow the instructions in this section to generate the access token with the application access key, secret key, and system timestamp and use it to invoke the APIs.

4.1.1 Get Access Token

Get the access token using the access key and secret key of your application.

If the access token for your application is already generated, when you call the *Get Access Token* API again, the same access token will be returned if the access token has not expired.

4.1.1.1 Prerequisites

Register an application on EnOS Management Console to get the application's access key and secret key, which are used as the values of the appKey and appSecret request parameters of the *Get Access Token* API.

Request Format

```
POST https://{apigw-address}/apim-token-service/v2.0/token/get
```

4.1.1.2 Request Parameters (Body)

Name	Manda-tory/Optional	Data Type	Description
appKey	Mandatory	String	The access key of the application.
encryption	Mandatory	String	The encrypted ciphertext.
timestamp	Mandatory	Long	The timestamp of the current system time (UNIX time, accurate to the millisecond), e.g. 1572574909697.

4.1.1.3 Encryption Generation Rule

1. Concatenate the values of appKey, timestamp, and appSecret to generate a string for encryption.
2. Encode the concatenated string in UTF-8 format and make a digest by SHA256 algorithm.
3. Convert the digest to hexadecimal format to generate the encrypted ciphertext. The sample code is as per the below.

```
sha256(appKey+timestamp+appSecret).toLowerCase();
```

4.1.1.4 Response Parameters

Name	Data Type	Descritpion
status	Integer	The API request status code, with 0 indicating a successful request.
msg	String	The explanation of the status code.
business	String	The business parameter, with the value *apim-token-service*.
data	Data Struct	The generated access token and its expiring time.

4.1.1.5 Data Struct

Name	Data Type	Description
accessToken	String	The value of the generated access token.
expire	Integer	The expiring time of the access token in seconds, with an initial value of 7,200 (i.e. 2 hours).

4.1.1.6 Request Sample

```
url: https://{apigw-address}/apim-token-service/v2.0/token/get method:
POST requestBody:
{
      "appKey": "yourAppKey",
      "encryption": "87c6885cec7525e2f219f86a82b280cc8c2d6ff4040a4b5f8acf9aeeda37aba8",
      "timestamp": 1572574909697 }
```

4.1.1.7 Return Sample

```
{
      "stauts": 0,
      "msg": "SUCCESS",
      "business": "apim-token-service", "data": {
            "accessToken": "Generated_Access_Token",
            "expire": 7200
      }
}
```

4.1.2 Refresh Access Token

Refresh the generated access token before it expires (the expiring time of the access token is 2 hours by default).

4.1.2.1 Request Format

```
POST https://{apigw-address}/apim-token-service/v2.0/token/refresh
```

4.1.2.2 Request Parameters (Body)

Name	Manda-tory/Optional	Data Type	Description
appKey	Mandatory	String	The access key of the application.
encryption	Mandatory	String	The encrypted ciphertext.
timestamp	Mandatory	Long	The timestamp of the current system time (UNIX time, accurate to milliseconds), e.g. 1572574909697.
accessToken	Mandatory	String	The access token to be refreshed.

4.1.2.3 Response Parameters

Name	Data Type	Descritpion

status	Integer	The API request status code, with 0 indicating a successful request.
msg	String	The explanation of the status code.
business	String	The business parameter, with the value *apim-token-service*.
data	Data Struct	The refreshed access token and its expiring time.

4.1.2.4 **4.2.3.1 Data Struct**

Name	Data Type	Description
accessToken	String	The refreshed access token.
expire	Integer	The expiring time of the access token in seconds, with an initial value of 7,200 (i.e. 2 hours).

4.1.2.5 Request Sample

```
url: https://{apigw-address}/apim-token-service/v2.0/token/refresh method:
POST requestBody:
{
      "appKey": "yourAppKey",
      "encryption": "87c6885cec7525e2f219f86a82b280cc8c2d6ff4040a4b5f8acf9aeeda37aba8",
      "accessToken":"yourAccessToken",
      "timestamp": 1572574909697 }
```

4.1.2.6 Return Sample

```
{
      "status": 0,
      "msg": "SUCCESS",
      "business": "apim-token-service", "data": {
            "accessToken": "Refreshed_Access_Token",
            "expire": 7200
      }
}
```


4.1.3 Invoke API with the Access Token

Follow the instructions below to invoke EnOS APIs with the generated access token.

4.1.3.1 Before You Start

Before invoking an EnOS API with the access token, you need to have the values of appKey, appSecret, accessToken, and timestamp ready.

4.1.3.2 Procedure

4.1.3.3 Constructing the paramsData

1. Sort all the parameters of the API in the URL by ASCII sort order.
2. Concatenate the sorted parameters and their values into a string.
3. If the API request requires a JSON formatted request body, append the request body after the concatenated string to form the paramsData.

Note: The request body that is included in the *paramsData* must be identical with what is sent in the API request. Otherwise, the verification will fail.

4.1.3.4 Constructing the apim-sign

1. Concatenate the values of accessToken, paramsData, timestamp, and appSecret into a string to form the signData.
2. Encode the concatenated string signData in UTF-8 format and make a digest by SHA256 algorithm.
3. Convert the digest to hexadecimal format to generate the encrypted ciphertext apim-sign. The sample code is as per the below.

```
sha256(signData).toLowerCase();
```

4.1.3.5 Constructing the Request Header

Include the following parameters in the API request header.

```
apim-accesstoken: accessToken
apim-signature: apim-sign apim-
timestamp: timestamp
```

4.1.3.6 Error Codes

Code	Description
0	SUCCESS
1001	Repeated requests with duplicated encryption.
1002	The appKey does not exist.

1003	The encryption is not valid.
1004	Invalid parameter.
1005	Internal service exception.
1202	The parameter is empty.
1203	The access token has expired.
1204	Failed to refresh the access token.

4.1.3.7 Sample

Request URL

```
https://{apigw-address}/m/v1/b?k3=v3&k1=v1&k2=v2
```

4.1.3.8 Request Body

```
{
  "count": 20,
  "page": 1,
  "desc": "Description" }
```

4.1.3.9 Request Parameters

Parameter	Value
accessToken	xxxxaaaxxxx
appSecret	xxxappSecretxxx
timestamp	1572574909697

4.1.3.10 Request Steps

Follow the steps below to invoke the API with the access token.

1. Sort the parameters k3, k1, k2 in the URL by ASCII order into k1, k2, k3.
2. Concatenate the sorted parameters and their values into a string k1v1k2v2k3v3.
3. Concatenate the string k1v1k2v2k3v3 and the request body into the following string.

```
k1v1k2v2k3v3{
"count": 20,

"page": 1,

"desc":
"Description" }
```

4. Concatenate the values of accessToken, paramsData, timestamp, and appSecret into the following string.

```
xxxxaaaxxxxk1v1k2v2k3v3{

"count": 20,
```

```
"page": 1,
"desc": "Description"
}1572574909697xxxappSecretxxx
```

5. Encode the above concatenated string in UTF-8 format and make a digest by SHA256 algorithm. Convert the digest to hexadecimal format to generate the signature. Example:

```
59828328f6c1f9771015dc74e4929ae30f518a35a3d2353972c2ea46556fc981
```

6. Send the API request. Example:

```
curl https://{apigw-address}/m/v1/b?k3=v3&k1=v1&k2=v2 -X POST
-H 'apim-accesstoken:xxxxaaaxxxx'
-H 'apim-signature:59828328f6c1f9771015dc74e4929ae30f518a35a3d2353972c2ea46556fc981'
-H 'apim-timestamp:1572574909697'
-d '{
"count": 20,
"page": 1,
"desc": "Description"
}'
```

4.1.3.11 Java Request Sample

```
import okhttp3.*;

import java.io.IOException;
import java.nio.charset.StandardCharsets; import
java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;
import java.util.Collections; import java.util.List;
import java.util.stream.Collectors;

/**
     *  @author lixiangxin
     *  @date 2019/10/24 18:56**/ public class EncryptUtils {

    /**
     *  Encryption with Java Class
     *
     *  @param str Encrypted string
     *  @return*/ public static String getSHA256(String str) {
        MessageDigest messageDigest; String encodestr = ""; try
        { messageDigest = MessageDigest.getInstance("SHA-256");
        messageDigest.update(str.getBytes(StandardCharsets.UTF_8));
        encodestr = hexString(messageDigest.digest());
        } catch (NoSuchAlgorithmException e) { return
            encodestr;
        }

        return encodestr;
    }

    private static String hexString(byte[] b) { StringBuilder hs = new
        StringBuilder();
        String stmp;
        for (int n = 0; b != null && n < b.length; n++) { stmp =
            Integer.toHexString(b[n] & 0XFF);
            if (stmp.length() == 1) { hs.append('0');
            }
            hs.append(stmp);
        }
        return hs.toString();
    } public static void main(String[] args) throws IOException {

        String accssToken = "xxxxaaaxxxx"; String
        appSecret = "xxxappSecretxxx";
        long timestamp = 1572574909697L; //System.currentTimeMillis();

        String url = "https://{apigw-address}/m/v1/b?k3=v3&k1=v1&k2=v2"; String
        requestBody = "{\n" +
                " \"count\": 20,\n" +
                " \"page\": 1,\n" +
                " \"desc\": \"Description\"\n" + "}";
```

```
        HttpUrl httpUrl = HttpUrl.parse(url); if (httpUrl
        == null) {
            return;
        }

        List<String> keys = new ArrayList<>(httpUrl.queryParameterNames()); Collections.sort(keys);

        StringBuilder paramsData = new StringBuilder(); for (String
        key : keys) {
            String value = httpUrl.queryParameter(key); paramsData.append(key).append(value);
        }
        paramsData.append(requestBody);
        String signData = accssToken + paramsData.toString() + timestamp + appSecret; String apimSign
        = getSHA256(signData);

        RequestBody body = FormBody
                        .create(MediaType.parse("application/json; charset=utf-8"), requestBody);

        Request request = new Request.Builder().url(url).method("POST", body)
                    .addHeader("apim-accesstoken", accssToken)
                    .addHeader("apim-signature", apimSign)
                    .addHeader("apim-timestamp", timestamp + "") .build();

        String res = new OkHttpClient().newCall(request).execute().body().string();
        System.out.println(res);
    }
}
```