Olivine Interval Data Format

# Format

The Olivine Interval Data (OID) Format is used to communicate interval data, such as interval meter readings or prices. This is a tab-delimited format, where individual fields (columns) are separated by tab characters.

***Notes for DSGS Option 3 VPP Aggregator Submetering:***

* This general OID Format has been annotated with specific details regarding how VPP aggregators must provide sub-metered data for Demand Side Grid Support (DSGS) Incentive Option 3 incremental capacity and payment calculations.
* The following specifics have been defined for this project:
  + Hourly or 15-minute submeter or inverter-level measured battery net discharge data, where positive numbers will indicate net charging; negative will indicate net discharge.
  + Files must be formatted with 1 service agreement meter-day per row[[1]](#footnote-2).
  + All intervals for each day shall be provided.
  + Data should be provided for each month for which any site is enrolled.
* If the data needs to be provided in multiple files, sort the data first as specified in Section 4.1 before splitting the data into smaller files.
* Timestamps are formatted with time zone offset. Olivine’s preference is to receive the data in local time with offset (i.e., -7:00); however, UTC is also acceptable. See section 7.
* Gzip the file(s). The file extension must be: .oid.gz

# Fields

The following table lists the individual fields. Each table row is a column in the data file. The header row in each file must contain the exact name listed in the "Column Name" values. All fields must be supplied, even if they are optional and their values are blank. All values provided must follow the corresponding specified description. The columns must appear from left to right in the order in which they appear in the table and be separated by tab characters.

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Type** | **Description** |
| Service Point ID | string | This field must uniquely identify the meter, service delivery point, or other designator for the container (i.e., Olivine node tag).  ***DSGS: This is the Unique ID from the Enrolled Participation Reports. It is the identification number that uniquely identifies the customer from the perspective of the VPP aggregator.*** |
| Parent ID | string | Optional. Can be used to identify a parent entity (e.g. Account Number). The entity identified by the Parent ID field is not strictly defined by this spec.  ***DSGS: This is the same value as provided in the Service Point ID column.*** |
| Channel Number | Integer | Optional. The channel number, as specified by the data collection/meter data management system.  ***DSGS: Leave empty.*** |
| Kind | string | Optional. Can be used to specify the commodity or similar characteristics of the meter. Allowed values are implementation-specific.  ***DSGS: Specify ‘Storage’*** |
| UOM | string | The unit of measure, such as kWh. Parsing of this field must NOT be case sensitive. See Units of Measure section for a list of supported values.  ***DSGS: Specify ‘kW’ or ‘kWh’.*** |
| Flow Direction | string | Optional. Indicates the direction of current flow for metered data. Can be left empty if unspecified. See Flow Direction section for a list of supported values.  ***DSGS: Specify ‘Net’ to denote a single net channel combining charge and discharge.*** |
| Interval Length | Integer | In seconds (e.g. 900 corresponds to 15-minute interval data).  ***DSGS: use ‘3600’ for 1-hour intervals or 900 for 15-minute intervals.*** |
| Start Time | DateTime with offset | This is the **start time** of the first interval in the row. This field can be left empty *only* if the file includes a single interval per row.  ***DSGS: Example: 2021-09-10T00:00:00-7:00*** |
| End Time | DateTime with offset | This is the e**nd time** of the last interval in the row.  ***DSGS: Example: 2021-09-11T00:00:00-7:00*** |
| Count | Int | Total number of intervals in the row.  ***DSGS: 24 for hourly, 96 for 15-minte (***Note that DST transition days can be supported with 92 or 100 intervals or record start times can be shifted accordingly***)*** |
| Interval values (no column name in header row) | Decimal or Composite | Interval values and status codes. There can be multiple columns, representing successive intervals (see Interval Values section below).  ***DSGS: we are not expecting interval flags, so this would be interval values. If providing single net channel, positive numbers indicate net charge and negative numbers indicate net discharge.*** |

# Interval Values

## Number of Intervals per Row

The format supports one or more intervals per row. Typically, there will either be a single interval or an entire day of intervals in the relevant time zone, but the format does not explicitly restrict the number of allowed intervals. When providing data in volume to Olivine, it is recommended that you include a whole day in each row, but for ad-hoc uploads, it is OK to provide files with a single interval per row.

## Missing Interval Values

In cases where multiple intervals are included in a row, individual interval columns must be left empty to indicate missing data.

In cases where the file contains a single interval per row, then the whole row should be omitted.

## Individual Column Formatting

Interval columns should be formatted as a decimal value and an optional set of interval status codes.

If a status codes are included, they should follow the interval value and be separated by it with a pipe (|) character.

The pipe character should not be included if there is no status code.

Multiple status codes can be included, with no separators (e.g. “1.23|CP” indicates both a “C” and a “P” status code).

Status codes are represented as single alphanumeric characters. See the Interval Status Codes section for a list of supported status codes.

# File Organization

## Sorting

Sort rows by Parent ID, Service Point ID, Channel Number, Kind, UOM, Flow Direction, StartTime and EndTime.

## Duplicate Intervals

Files should not contain data for the same interval more than once. All data must be consolidated before generating the file.

# Header Row

Files must include a header row, containing a tab-delimited list of the exact names specified in the "Column Name" values of the table in the Fields section. Columns containing interval values need not have a corresponding column heading.

# Format Variants

There is only one file format, but there is some flexibility in how data is provided:

* Rows may include a single interval or multiple intervals.
* Status codes can be included with interval values, or omitted.
* Times can be expressed in local time (with offset), or in UTC, noting that local time w/offset is preferred as it captures more information than UTC alone.
* The StartTime can be left empty if the file contains a single interval per row.

## Files Consumed by Olivine DER

Olivine DER will accept all variants, as long as they abide by the rules defined in this document.

## Files Created by Olivine DER

Olivine DER will produce files in different variants to make it easier for recipients to parse the data. The following options are available:

* Single interval per row – status codes not included.
* Complete local day in a single row – status codes not included.
* Complete interval block for a given channel in a single row – status codes not included.
* Complete local day in each row – status codes included (later).

Both the StartTime and EndTime will always be populated, regardless of the number of intervals per row.

Times will always be in node or program-local time (with correct UTC offset).

# Date and Time Formatting

The start and end time fields must be formatted as described in this section.

Exactly the components shown here must be present, with exactly this punctuation.

YYYY-MM-DDThh:mmTZD or YYYY-MM-DDThh:mm:ssTZD

* YYYY: Four-digit year
* MM: Two-digit month (01 - 12)
* DD: Two-digit day (01 - 31)
* hh: Two-digit hour (00 - 59)
* mm: Two-digit minute (00 – 59)
* ss: Two-digit second (00 – 59). This is optional.
* TZD: The time zone designator (Z for UTC or +hh:mm or -hh:mm)
  + -07:00 for Pacific Daylight Time

## Notes

* The “T” appears literally in the string, to indicate the beginning of the time element.
* Preferably times will be expressed in the local time zone with the correct offset, but UTC is acceptable.
* All parts are required, except *seconds*, which is optional and should only be included if the interval length is shorter than 1 minute.
* Always add leading zeros to the month, day, hour, minute and (if present) second portions.
* There should be no spaces between any of the elements.
* The format is based on ISO 8601, but the Olivine specification is stricter. For example this format does not support optional decimal digits for *seconds*.

## Examples

The following examples correspond to the same time (May 23, 2017 2:15 PM Pacific Time):

2017-05-23T14:15-07:00  
2017-05-23T14:15:00-07:00  
2017-05-23T21:15Z

## Daylight Saving Time

If times are expressed in local time, care must be taken to provide the correct time and offset for each interval. Here’s an example for the spring DST transition in Pacific Time:

2017-03-12T00:15-08:00  
2017-03-12T00:30-08:00  
2017-03-12T00:45-08:00  
2017-03-12T01:00-08:00  
2017-03-12T01:15-08:00  
2017-03-12T01:30-08:00  
2017-03-12T01:45-08:00  
2017-03-12T03:00-07:00  
2017-03-12T03:15-07:00  
2017-03-12T03:30-07:00  
2017-03-12T03:45-07:00  
2017-03-12T04:00-07:00  
…

Below is an example for the fall DST transition in Pacific Time:

2017-11-05T00:15-07:00  
2017-11-05T00:30-07:00  
2017-11-05T00:45-07:00  
2017-11-05T01:00-07:00  
2017-11-05T01:15-07:00  
2017-11-05T01:30-07:00  
2017-11-05T01:45-07:00  
2017-11-05T01:00-08:00  
2017-11-05T01:15-08:00  
2017-11-05T01:30-08:00  
2017-11-05T01:45-08:00  
2017-11-05T02:00-08:00  
2017-11-05T02:15-08:00  
2017-11-05T02:30-08:00  
…

## Format Designators in Various Development Languages:

|  |  |
| --- | --- |
| **Language** | **Format** |
| Microsoft .NET | yyyy-MM-ddTHH:mmzzz or yyyy-MM-ddTHH:mm:sszzz |
|  |  |
|  |  |

# File Naming

Extension: \*.oid

Additional file naming rules may be provided for specific implementations.

***DSGS:*** *DSGS-Option-3-<ProviderName>-MeterData-YYYYMMDDHHmmSS-<nnn>.oid.gz*

* + *ProviderName is the name of the enrolled DSGS provider*
  + *n = number, incremented for files generated in the same second*
  + *HH must be 24-hour format*
  + *YYYYMMDDHHmmSS is the time at which the file was generated*
* *Example:*
  + *DSGS-Option-3-<ProviderName>-MeterData-20221014082356-000.oid.gz*
  + *DSGS-Option-3--<ProviderName>-MeterData-20221014082356-001.oid.gz*
  + *DSGS-Option-3-<ProviderName>-MeterData-20221014082358-000.oid.gz*

# Units of Measure

The following units of measure are currently supported:

|  |  |
| --- | --- |
| Value | Description, if necessary |
| kWh |  |
| kW |  |
| kVARh |  |
| kVAR |  |
| kVAh |  |
| kVA |  |
| kQh |  |
| kQ |  |
| Factor | A general factor value (e.g. a loss factor), expressed as a decimal (not percent) value. |
| $ |  |
| $/kWh |  |
| $/MWh |  |

# Flow Direction

The Flow Direction field is optional, but it is imperative to specify the flow direction in cases where the implementation supports data with a non-forward flow.

|  |  |
| --- | --- |
| **Value** | **Description** |
| Forward | "Delivered," or "Imported" energy. Must always be a positive value |
| Reverse | "Received," or "Exported" energy. Must always be a positive value |
| Net | Net metered (Forward minus Reverse flow). Can be positive or negative. |

# Interval Status Codes

The following interval status codes are supported to indicate the reading quality or individual intervals:

|  |  |
| --- | --- |
| **Value** | **Description** |
| V | Validated: Data that that has been validated and possibly edited and/or estimated in accordance with approved procedures |
| C | Calculated: Data that has been derived through logic or mathematical operations |
| F | Forecast: Data has been calculated as a projection of future readings |
| P | Preliminary: Data is preliminary and will probably change (e.g. customer baseline intervals, calculated from older days, due to missing data in more recent days) |

1. Note that DST transition days can be supported with 92 or 100 intervals or record start times can be shifted accordingly. [↑](#footnote-ref-2)