




# ISO Interface Specification

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## MRI-Settlements

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 <b>California ISO</b>	<b>Technology</b>	<b>Template Version:</b>	[Template Version]
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## Location of Document

# Revision History


Date	Version	Description	Author
10/18/2017	1.0	Initial Version	CAISO
03/10/2016	1.1	Revised element specifications and added more comments and examples for clarification.	CAISO
03/28/2016	1.2		CAISO
04/06/2016	1.3	Re-ordered Sections 5 and 6. Changes to MeterData XSD incorporated	CAISO
05/13/2016	1.4	Refined SLA section and included AUP, Included Sample request with ALL keyword, and Included more error codes	CAISO
06/24/2016	1.5	Added AUP errors. Included CSV and MDEF file specification for UI submission	CAISO
07/20/2016	1.6	Clarified that RegisteredIntertie will not be used for data submission and provided description for flow gate. Removed sample submissions and retrieve for RegisteredIntertie. Additional error codes included	CAISO
08/16/2016	1.7	Provided Measurement type to resource type mapping Added Z for the intervalendtime that was missing in the samples	CAISO
09/16/2016	1.8	Modified the resource type to measurement type mapping Modified the sample submission in section 4.4.3.1.4 from a pump resource to any generator resource, including pumps	CAISO
11/1/2016	1.9	1. Changes to SLA and AUP sections and corresponding errors 2. Changes to RequestMeterData_v1.xsd to include SCID, timeIntervalLength and updatedSinceDateTime	CAISO

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Date	Version	Description	Author
		3. Added sample request for retrieveMeterData to show the use of new optional elements	
11/9/2016	1.10	Added PMAX validation error message	CAISO
11/11/2016	1.11	Added error code 1029	CAISO
06/19/2017	1.12	Corrected sample XMLs for typos in time format. Added error code 1030 for negative meter data value validation intended to be included in a future release, 1.2.0. Revised the API performance specifications to align with the L & P test results.	CAISO
10/18/2017	2.0	1. Cardinality change in MeterDataRequest class in RequestMeterData XSD to support better performance when multiple resource IDs are requested 2. Added a new measurement type of "MBMA" that will be active with ESDER 2 project activation for DRS replacement 3. Added error code 1031	CAISO
05/15/2018	2.1	1. Added the new measurement types "CBL" and "TMNT" that will be active with ESDER 2 project activation	CAISO
07/13/2018	2.2	Added new measurement types in all the affected element tables as well as the CSV specification. Removed references to Fall 2016 implementation	CAISO
5/10/2019	2.3	Added new measurement type "BASE" for collecting calculated Customer Load Baseline data. Updated Section 3 with AUP for MRI-S API Requests.	CAISO

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# 1. Introduction

## 1.1 Purpose

This document describes the Market Participant interface to CAISO’s MRI-Settlements (*OMAR Replacement*) web services. As part of the OMAR Replacement project, the current OMAR Online interface is being replaced with an enhancement to the existing MRI-Settlements interface. This will enable market participants to submit and download meter data from MRI-Settlements, which was previously used to only download Settlement files. It provides the WSDL, XSD, and XML information required by application programmers to create and send messages and to process response messages.

## 1.2 Contact Information

For any questions regarding this document or technical questions related to integrating applications with CAISO’s OMAR Replacement web services, please send email to [ServiceDesk@caiso.com](mailto:ServiceDesk@caiso.com)

## 1.3 Related Documents

CAISO’s ISO MARKET program has produced a set of documents describing its web services architecture and associated interfaces to the Bidding, Market Results, Trades, and Sandbox services. *CASIO’s ISO MARKET Web Services Architecture & Integration Specification* is the top-level document in this set; Market Participants and their application programmers should read this document to gain an overall understanding of CASIO’s web services architecture prior to reading any of the detailed documents shown below.

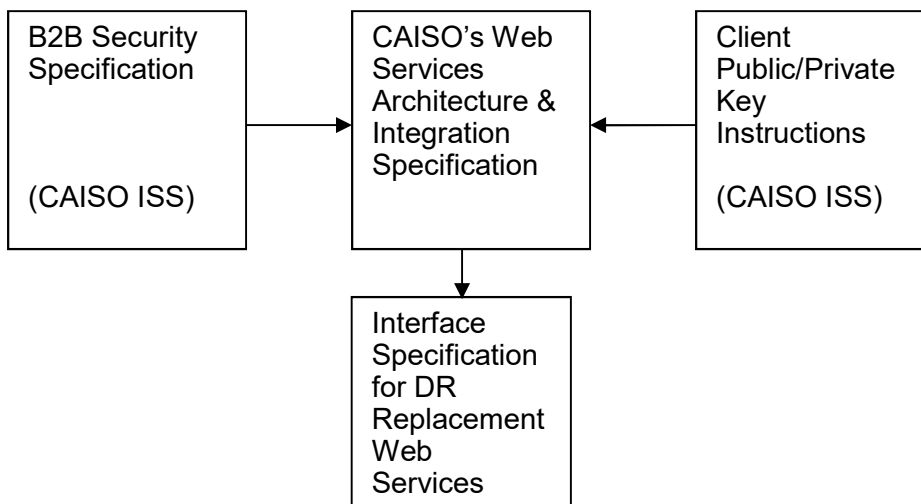



Figure 1 – ISO MARKET Web Services Interface Specification Document Set

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The ISO MARKET Web Services Interface Specification Document Set is available online at the locations indicated below.

Doc. No.	Document Name	Location
1	ISO MARKET B2B Security Specification	<a href="https://portal.caiso.com">https://portal.caiso.com</a>
2	Client Public/Private Key Instructions	<a href="http://www.caiso.com/Documents/ClientPublic_PrivateKeyGuidelines.pdf">http://www.caiso.com/Documents/ClientPublic_PrivateKeyGuidelines.pdf</a>

## 1.4 Release Notes

### Release Notes for ISO Interface Specification for *OMAR Online Replacement Web Services Version 1*


This document release 1.0 will be the first release of the interface specification

The services being created for OMAR Online Replacement effort are the following:

1. submitMeterData\_v1 – submit a create or modify request for meter data
2. submitMeterData\_v1\_DocAttach – submit a create or modify request for meter data for .net clients
3. retrieveMeterData\_v1 – retrieve request for meter data of a resource
4. retrieveMeterData\_v1\_DocAttach – retrieve request for meter data of a resource for .net clients
5. retrieveBatchValidationStatus\_v1 – to request the status on a submission of a create or modify
6. retrieveBatchValidationStatus\_v1\_DocAttach – to request the status on a submission of a create or modify for .net clients

## 1.5 API Transition Support

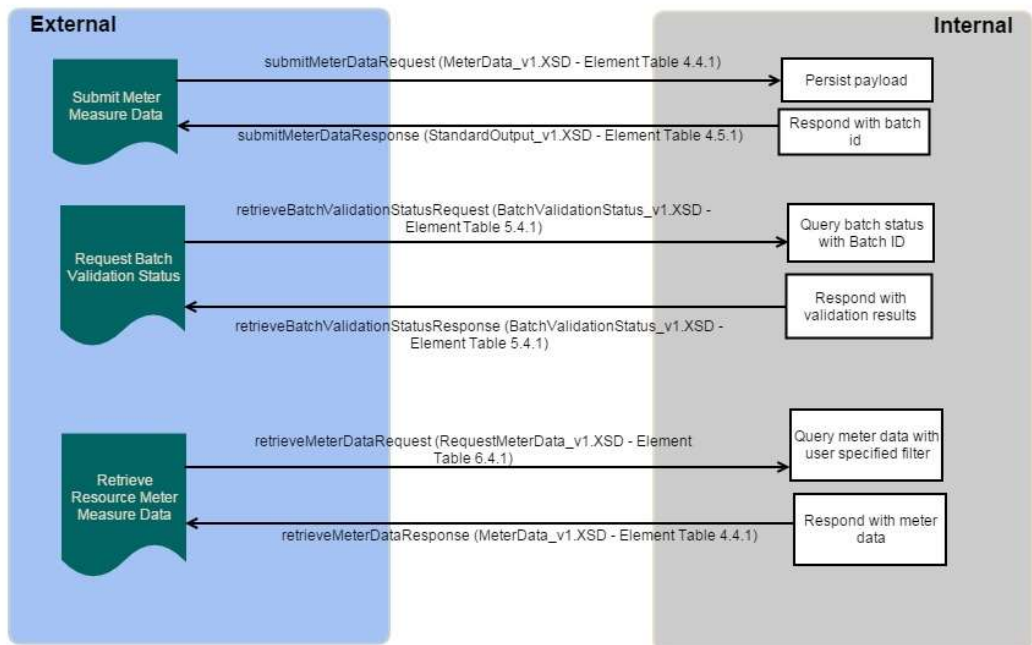
Initial Implementation

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## 2. Business Scenario

Market Participants can retrieve or submit the following data via the *OMAR Replacement* web services:

- Retrieve Meter data
- Submit request for Meter data
- Submit modification request for Meter data
- Retrieve status for the creation or modification requests





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### 3. Service Level Agreement

The following service level agreement defines the business and technical requirements for service availability and performance.

<b>Service availability</b>	<i>Service Level goal is 99.9%.</i>
<b>Expected maximum size of payload</b>	<i>15 MB Uncompressed</i>
<b>Expected frequency (average and maximum)</b>	<i>5 Seconds</i>
<b>Longest time the service can be unavailable before business is impacted</b>	<i>4 hours</i>
<b>Business impact if is unavailable</b>	<i>Market Participants utilizing the service will not be able to submit or retrieve Meter Data, Baseline or Performance data</i>
<b>Expected response time for standard output for a submit</b>	<i>&lt;5 Seconds</i>
<b>Expected wait time for batch validation to be completed</b>	<i>5 Minutes</i>
<b>Expected time to retrieve meter data up to 100,000 records</b>	<i>&lt;120 Seconds on average</i>

#### Acceptable Use Policy

For meter data submission, the maximum acceptable size of the attachment is 15 MB uncompressed. SCs can adjust either the trade date range or the number of resources being submitted to adhere to this requirement. Any submission with an attachment size greater than 15 MB will result in the following error being generated:


Use policy violated with an attachment of size XX\* MB. Maximum allowed attachment size is 15 MB.

For meter data retrieve, we will use the number of database records in the resulting data set to control the volume and performance. We will do a count for the number of records requested and will limit this to 200,000. SCs can use the keyword ALL for the four distinct resource types and can also control the trade date interval being requested so that the resulting data set is within the limit of 200,000 records. Any retrieve request that results in more than 200,000 database records being retrieved will result in the following error being generated:

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Use policy violated with YY\*\* records retrieved. Maximum allowed is 200,000 records.


\*actual payload size

\*\*actual number of database records retrieved

New Use Policy has been defined for MRI-S API requests. This change requires users to submit API requests for a specific retrieve service once every 30 seconds. Participants can retrieve other service requests during this duration (*i.e. 30 seconds*).

Users will get following response if they submit same request within 30 seconds of the previous request.

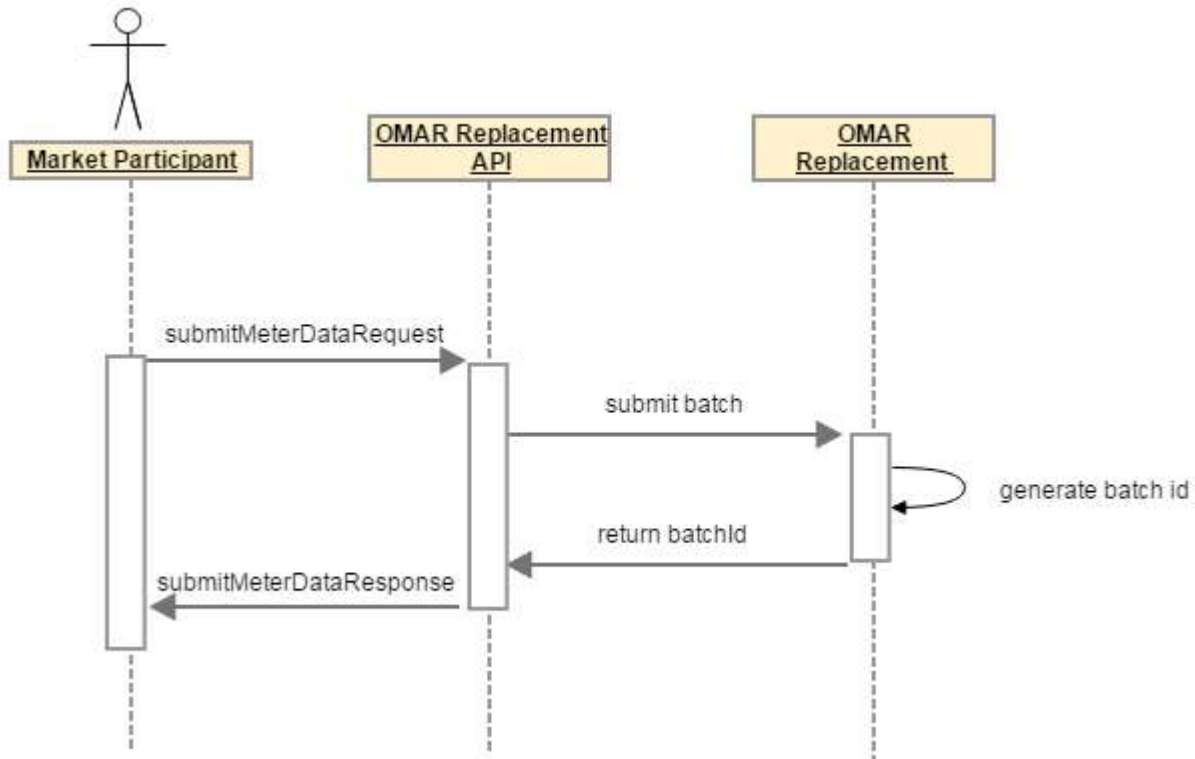
*“CAISO MRI-S Acceptable Use Policy Violation. Please retry your request again in 30 seconds from now. Note: Time resets each time you request before expiration.”*


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## 4. SubmitMeterData

### 4.1 Use Model

The diagram below shows the sequence for submitMeterData



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## 4.2 Operation Details

The service has *submitMeterData\_v1* operation with three message types. All input and output messages are in XML format.

Operation	Message Types	Message	WSDL	XSD
submitMeterData_v1	Input	submitMeterDataRequest	submitMeterData_v1.wsdl	MeterData_v1.xsd
	Output	submitMeterDataResponse	submitMeterData_v1_DocAttach.wsdl	StandardOutput_v1.xsd
	Fault	faultReturnResponse		StandardOutput_v1.xsd

## 4.3 WSDL (submitMeterData\_v1.wsdl)

- submitMeterData\_v1.wsdl – Used for normal SOAP messaging
- submitMeterData\_v1\_DocAttach.wsdl – Used when .NET is the source of processing

The WSDL can be found at the following location:

[Please refer to the latest version of the artifacts found under the technical specifications.](#)

## 4.4 Message Type: Submit Meter Data


SubmitMeterDataRequest

### 4.4.1 Element Table

Element	Data Description	Type/Length	Req'd
<b>MessageHeader</b>			
TimeDate	Application level relevant time and date for when this instance of the message was produced, in GMT Time format	datetime	Yes

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Element	Data Description	Type/ Length	Req'd
Source	Source system which provides data for this service	String	Yes
Version	Date reflecting the release this latest version update was related to. Valid value is: <b>v20160301</b>	String	Yes
<b>MessagePayload (required)</b>			
<b>MessagePayload.MeterMeasurementData (one to many occurrences)</b>			

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measurementType	<p>Type of the measurement.</p> <p><b>Valid values are: LOAD or GEN or MBMA or CBL or TMNT or BASE*</b>  <b>Meter Befor Meter After (MBMA), Baseline Load Data (CBL) and Treatment Group Load Data (TMNT) can only be used upon ESDER 2 project activation for DRS Replacement. *Calculated Customer Load Baseline data (BASE) can be submitted upon ESDER 3A project activation.</b></p> <p><b>Meter data submitted with CBL or TMNT or BASE measurement types cannot be retrieved using the API or the UI. This is only used for internal auditing purposes.</b></p> <p>Measurement types are the same as channel ID in current metering solution. LOAD is channel 1, GEN is channel 4 and MBMA is channel 9.</p> <p>The resource type and sub type to measurement type mapping is provided in the table below. The resource ID should always be entered in the XML element that matches the resource type classification in the MF. For example, when submitting data for an energy storage unit, the resource ID should always be included in RegisteredGenerator element even though the measurementtype can be either LOAD or GEN. <b>Please see sample XML (4.4.3.1.4) for a Generator resource to submit data for the same resource for both measurement types</b></p> <table border="1" data-bbox="435 1024 1317 1709"> <thead> <tr> <th>Master File RES TYPE</th> <th>Master File RES SUBTYPE</th> <th>Master File PDR Res</th> <th>XML Element</th> <th>Measurement Type</th> </tr> </thead> <tbody> <tr> <td>GEN</td> <td>All Generators including Pumps, Storage etc.</td> <td>No</td> <td>RegisteredGenerator</td> <td>GEN or LOAD</td> </tr> <tr> <td>GEN</td> <td>All Generators</td> <td>Yes</td> <td>RegisteredGenerator</td> <td>If AS (Ancillary Services) resource, then: GEN or LOAD or MBMA or CBL or TMNT or BASE Else: GEN or CBL or TMNT or BASE</td> </tr> <tr> <td>TG</td> <td></td> <td></td> <td>RegisteredGenerator</td> <td>GEN</td> </tr> <tr> <td>LI</td> <td></td> <td></td> <td>RegisteredGenerator</td> <td>GEN or LOAD</td> </tr> <tr> <td>LOAD</td> <td></td> <td></td> <td>RegisteredLoad</td> <td>LOAD</td> </tr> <tr> <td>TIE</td> <td></td> <td></td> <td>Flowgate</td> <td>GEN or LOAD</td> </tr> </tbody> </table> <p>Please refer to DRRS user guide for details on submission of measurement types for PDR resources.</p>	Master File RES TYPE	Master File RES SUBTYPE	Master File PDR Res	XML Element	Measurement Type	GEN	All Generators including Pumps, Storage etc.	No	RegisteredGenerator	GEN or LOAD	GEN	All Generators	Yes	RegisteredGenerator	If AS (Ancillary Services) resource, then: GEN or LOAD or MBMA or CBL or TMNT or BASE Else: GEN or CBL or TMNT or BASE	TG			RegisteredGenerator	GEN	LI			RegisteredGenerator	GEN or LOAD	LOAD			RegisteredLoad	LOAD	TIE			Flowgate	GEN or LOAD	String	Yes
Master File RES TYPE	Master File RES SUBTYPE	Master File PDR Res	XML Element	Measurement Type																																		
GEN	All Generators including Pumps, Storage etc.	No	RegisteredGenerator	GEN or LOAD																																		
GEN	All Generators	Yes	RegisteredGenerator	If AS (Ancillary Services) resource, then: GEN or LOAD or MBMA or CBL or TMNT or BASE Else: GEN or CBL or TMNT or BASE																																		
TG			RegisteredGenerator	GEN																																		
LI			RegisteredGenerator	GEN or LOAD																																		
LOAD			RegisteredLoad	LOAD																																		
TIE			Flowgate	GEN or LOAD																																		




Element	Data Description	Type/Length	Req'd
timeIntervalLength	Interval length of the trading time in minutes. <b>For submission, the valid values are: 5, 15 or 60</b> <b>For retrieval, values that would be populated based on the interval length specified in the retrieve request are: 5, 10, 15 or 60</b> The interval length should be the same for a trade date. For example, if the prior submission for the date happened in 5 minute intervals, all further revisions to the same date needs to be submitted with the same interval length.	Integer	Yes
unitMultiplier	The unit multiplier of the measured quantity. <b>Valid values are: M for Megawatt or k for kilowatt</b> Values are case sensitive.	Enumeration	Yes
unitSymbol	The unit of measure of the measured quantity. <b>Valid value is: Wh</b> Value is case sensitive.	Enumeration	Yes
<b>MessagePayload.MeterMeasurementData.DemandResponseRegistration (optional, for demand response only)</b> <b>This element should not be populated. It will be removed with the next revision of the XSD.</b>			
mRID	Master resource identifier of the registration (Registration ID)	String	Yes
demandResponsePerformanceMeasurement	Method used for the demand response performance measurement. Examples include Physical, Statistical etc.	String	No
<b>MessagePayload.MeterMeasurementData.MeasurementValue (Required, one to many occurrences) – all activity records created for this asset</b>			
intervalEndTime	End Datetime in GMT of the interval for which the meter value is being submitted or retrieved. This is interval ending.	dateTime	Yes
meterValue	Meter value or Meter Quantity. Decimal values should be (16, 8), meaning up to 8 digits before and after the decimal point. Example 1.12345678, 12022412.34 etc.	Decimal	Yes
timeStamp	Updated time stamp	dateTime	No
<b>MessagePayload.MeterMeasurementData.MeasurementValue.VersionInfo (Required, one to many occurrences)</b>			
measurementQuality	Quality of the measurement. <b>Valid values are: ACTUAL or ESTIMATED</b>	String	Yes



Element	Data Description	Type/Length	Req'd										
versionTag	<p>The version of the submission. <b>Will be populated only in the retrieve response. Cannot be specified for submissions.</b></p> <table border="1"> <tr> <th>RetrieveMeterDataRequest</th> <th>RetrieveMeterDataResponse</th> </tr> <tr> <td>CURRENT</td> <td>CURRENT</td> </tr> <tr> <td>PREVIOUS</td> <td>PREVIOUS</td> </tr> <tr> <td>HISTORY</td> <td>           CURRENT            PREVIOUS            T+3B            T+12B            T+55B            T+9M            T+18M            T+35M            T+36M         </td> </tr> <tr> <td>NULL</td> <td>CURRENT</td> </tr> </table> <p>HISTORY can be used to retrieve all versions. If no version is specified, then the default is CURRENT.</p> <p>The application will maintain two versions for a given data set: CURRENT and PREVIOUS. <b>All prior versions will not be maintained.</b></p> <p>Request for a version of HISTORY will result in a response of meter data that was used in each of the various settlements runs, which are T+3B, T+12B, T+55B, T+9M, T+18M, T+35M, T+36M, in addition to the CURRENT and PREVIOUS.</p>	RetrieveMeterDataRequest	RetrieveMeterDataResponse	CURRENT	CURRENT	PREVIOUS	PREVIOUS	HISTORY	CURRENT PREVIOUS T+3B T+12B T+55B T+9M T+18M T+35M T+36M	NULL	CURRENT	String	No
RetrieveMeterDataRequest	RetrieveMeterDataResponse												
CURRENT	CURRENT												
PREVIOUS	PREVIOUS												
HISTORY	CURRENT PREVIOUS T+3B T+12B T+55B T+9M T+18M T+35M T+36M												
NULL	CURRENT												
<b>MessagePayload.MeterMeasurementData.RegisteredGenerator *</b>													
mRID	Master resource identifier of the generator resources as specified by master file.	String	Yes*										
<b>MessagePayload.MeterMeasurementData.RegisteredIntertie *</b>													
mRID	Master resource identifier of the intertie resource as provided in the master file  <b>Note: This class will not be used in the current implementation and is included for potential future use.</b>	String	Yes*										
<b>MessagePayload.MeterMeasurementData.RegisteredLoad *</b>													
mRID	Master resource identifier of the load resource as provided in the master file	String	Yes*										



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Element	Data Description	Type/Length	Req'd
<b>MessagePayload.MeterMeasurementData.Flowgate *</b>			
mRID	Master resource identifier of the flowgate resources as specified by master file.  <b>A flowgate is defined as any schedule flow between two substations. In the metering space, an intertie and/or citigate is referred to as a flowgate.</b>	String	Yes*

\*Only one of these four elements is required at a given time

#### 4.4.2 Schema (MeterData\_v1.xsd)

The XSD can be found at the following location:  
Please refer to the latest version of the artifacts found under the technical specifications.

#### 4.4.3 Example XML File (SubmitMeterData\_v1.xml)

[SubmitMeterData\\_v1.xml](#)

##### 4.4.3.1 Requests

##### 4.4.3.1.1 Sample request for a GEN meter data submission + Actual


```
<? xml version="1.0" encoding="UTF-8"?>
<MeterData xmlns="http://www.caiso.com/soa/MeterData_v1.xsd#"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.caiso.com/soa/MeterData_v1.xsd# MeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterMeasurementData>

      <measurementType>GEN</measurementType>
      <timeIntervalLength>5</timeIntervalLength>
      <unitMultiplier>M</unitMultiplier>
      <unitSymbol>Wh</unitSymbol>
      <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        <meterValue>2.0</meterValue>
      </MeasurementValue>
    </MeterMeasurementData>
  </MessagePayload>
</MeterData>
```

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```

<timeStamp>2001-12-31T12:00:00</timeStamp>
  <VersionInfo>
    <measurementQuality>ACTUAL</measurementQuality>
  </VersionInfo>
</MeasurementValue>
<MeasurementValue>
  <intervalEndTime>2001-12-31T12:05:00Z</intervalEndTime>
  <meterValue>1.0</meterValue>
  <timeStamp>2001-12-31T12:00:00</timeStamp>
  <VersionInfo>
    <measurementQuality>ACTUAL</measurementQuality>
  </VersionInfo>
</MeasurementValue>
<RegisteredGenerator>
  <mRID>RES_001</mRID>
</RegisteredGenerator>
</MeterMeasurementData>
</MessagePayload>
</MeterData>

```


#### 4.4.3.1.2 Sample request for a LOAD meter data submission + Estimated

```

<? xml version="1.0" encoding="UTF-8"?>
<MeterData xmlns="http://www.caiso.com/soa/MeterData_v1.xsd#"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.caiso.com/soa/MeterData_v1.xsd# MeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterMeasurementData>

      <measurementType>LOAD</measurementType>
      <timeIntervalLength>5</timeIntervalLength>
      <unitMultiplier>M</unitMultiplier>
      <unitSymbol>Wh</unitSymbol>
      <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ESTIMATED</measurementQuality>
        </VersionInfo>
      </MeasurementValue>
    </MeasurementValue>
  </MessagePayload>
</MeterMeasurementData>

```

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<intervalEndTime>2001-12-31T12:05:00Z</intervalEndTime>
<meterValue>0.0</meterValue>
<timeStamp>2001-12-31T12:00:00</timeStamp>
  <VersionInfo>
    <measurementQuality>ESTIMATED</measurementQuality>
  </VersionInfo>
</MeasurementValue>
<RegisteredLoad>
  <mRID>LD_001</mRID>
</RegisteredLoad>
</MeterMeasurementData>
</MessagePayload>
</MeterData>

```


#### 4.4.3.1.3 Sample request for a Flow Gate meter data submission +Actual

```

<?xml version="1.0" encoding="UTF-8"?>
<MeterData xmlns="http://www.caiso.com/soa/MeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/MeterData_v1.xsd# MeterData_v1.xsd"
">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterMeasurementData>

      <measurementType>GEN</measurementType>
      <timeIntervalLength>5</timeIntervalLength>
      <unitMultiplier>M</unitMultiplier>
      <unitSymbol>Wh</unitSymbol>
      <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
      </MeasurementValue>
      <MeasurementValue>
        <intervalEndTime>2001-12-31T12:05:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
      </MeasurementValue>
    </MeterMeasurementData>
  </MessagePayload>
</MeterData>

```


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```

        </VersionInfo>
    </MeasurementValue>
    <Flowgate>
        <mRID>FG_001</mRID>
    </Flowgate>
</MeterMeasurementData>
<MeterMeasurementData>

    <measurementType>LOAD</measurementType>
    <timeIntervalLength>5</timeIntervalLength>
    <unitMultiplier>M</unitMultiplier>
    <unitSymbol>Wh</unitSymbol>
    <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
            <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
    </MeasurementValue>
    <MeasurementValue>
        <intervalEndTime>2001-12-31T12:05:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
            <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
    </MeasurementValue>
    <Flowgate>
        <mRID>FG_001</mRID>
    </Flowgate>
</MeterMeasurementData>
<MeterMeasurementData>
    <measurementType>GEN</measurementType>
    <timeIntervalLength>5</timeIntervalLength>
    <unitMultiplier>M</unitMultiplier>
    <unitSymbol>Wh</unitSymbol>
    <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
            <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
    </MeasurementValue>
    <MeasurementValue>
        <intervalEndTime>2001-12-31T12:05:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>

```

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```

        <VersionInfo>
            <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
    </MeasurementValue>
    <Flowgate>
        <mRID>FG_0012</mRID>
    </Flowgate>
    </MeterMeasurementData><MeterMeasurementData>

    <measurementType>LOAD</measurementType>
    <timeIntervalLength>5</timeIntervalLength>
    <unitMultiplier>M</unitMultiplier>
    <unitSymbol>Wh</unitSymbol>
    <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
            <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
    </MeasurementValue>
    <MeasurementValue>
        <intervalEndTime>2001-12-31T12:05:00Z</intervalEndTime>
        <meterValue>0.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
            <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
    </MeasurementValue>
    <Flowgate>
        <mRID>FG_0012</mRID>
    </Flowgate>
</MeterMeasurementData>

</MessagePayload>
</MeterData>


```

#### 4.4.3.1.4 Sample request for a Generator Resource with both LOAD and GEN meter data submission +Actual

```

<?xml version="1.0" encoding="UTF-8"?>
<MeterData xmlns="http://www.caiso.com/soa/MeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/MeterData_v1.xsd# MeterData_v1.xsd"
">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>

```

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```

    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterMeasurementData>

      <measurementType>GEN</measurementType>
      <timeIntervalLength>5</timeIntervalLength>
      <unitMultiplier>M</unitMultiplier>
      <unitSymbol>Wh</unitSymbol>
      <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        <meterValue>1.0</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
      </MeasurementValue>
      <MeasurementValue>
        <intervalEndTime>2001-12-31T12:05:00Z</intervalEndTime>
        <meterValue>1.1</meterValue>
        <timeStamp>2001-12-31T12:00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
        </VersionInfo>
      </MeasurementValue>
      <RegisteredGenerator>
        <mRID>ABC _UNIT1</mRID>
      </RegisteredGenerator>
    </MeterMeasurementData>
  </MeterMeasurementData>


  <measurementType>LOAD</measurementType>
  <timeIntervalLength>5</timeIntervalLength>
  <unitMultiplier>M</unitMultiplier>
  <unitSymbol>Wh</unitSymbol>
  <MeasurementValue>
    <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
    <meterValue>0.8</meterValue>
    <timeStamp>2001-12-31T12:00:00</timeStamp>
    <VersionInfo>
      <measurementQuality>ACTUAL</measurementQuality>
    </VersionInfo>
  </MeasurementValue>
  <MeasurementValue>
    <intervalEndTime>2001-12-31T12:05:00Z</intervalEndTime>
    <meterValue>0.85</meterValue>
    <timeStamp>2001-12-31T12:00:00</timeStamp>
    <VersionInfo>
      <measurementQuality>ACTUAL</measurementQuality>
    </VersionInfo>
  </MeasurementValue>

```

---

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```

    </MeasurementValue>
    <RegisteredGenerator>
      <mRID>ABC _UNIT1</mRID>
    </RegisteredGenerator>
  </MeterMeasurementData>
</MessagePayload>
</MeterData>

```

## 4.5 Message Type : Standard Output


submitMeterDataResponse and faultReturnTypes both conform to the StandardOutput.xsd

### 4.5.1 Element Table

Element	Data Description	Type / Length	Req'd
<b>StandardOutput (required)</b>			
<b>MessageHeader (optional)</b>			
TimeDate	Application level relevant time and date for when this instance of the message was produced, in GMT Time format	datetime	No
Source	Source system which provides data for this service	String	No
Version	Date reflecting the release this latest version update was related to.	String	No
<b>MessagePayload (required)</b>			
<b>EventLog.Service (required)</b>			
id	The service Id (created by the web service). This is an internal service id used for tracking the transaction and will be used for troubleshooting.	String	Yes
name	The name of the service as used by the Web Service. This is an internal service name used for tracking the transaction and will be used for troubleshooting.	String	Yes
<b>EventLog.Event (required)</b>			
creationDateTime	Time of creation of XML	datetime	No

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Element	Data Description	Type / Length	Req'd
description	Description of event	String	No
id	Id of the event  This is an internal event id used for tracking the transaction and will be used for troubleshooting.	integer	Yes
result	Result of submission  Valid values are: Success or Error	String	Yes
<b>EventLog.Batch (optional)</b>			
mRID	This represents the batch ID for submission of a request.  Market participants will use this batch ID to query for the status of submission.	String	Yes
creationTime	Batch ID creation time in GMT	dateTime	No

## 4.5.2 Schema

StandardOutput\_v1.xsd

The XSD can be found at the following location:

[Please refer to the latest version of the artifacts found under the technical specifications.](#)

## 4.5.3 Example XML File (StandardOutput.xml)

### 4.5.3.1 Response

#### 4.5.3.1.1 Sample SUCCESS response for submitMeterData request


```
<? xml version="1.0" encoding="UTF-8"?>
<StandardOutput xmlns="http://www.caiso.com/soa/StandardOutput_v1.xsd#">
  <MessageHeader>
    <TimeDate>2016-03-07T12:51:08.774+00:00</TimeDate>
    <Source>stlmt</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <EventLog>
      <Batch>
```

---

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```

        <mRID>2805</mRID>
    </Batch>
</Event>
    <creationDateTime>2016-04-07T22:47:55.754Z</creationDateTime>
    <description>Successfully received</description>
    <id>0198514e-6b53-41a1-9d6c-1ab09dc84926</id>
    <result>Success</result>
</Event>
</Service>
    <id>99ad2c93-2681-45b0-bf5e-4aba80326ff5</id>
    <name>submitMeterData_v1</name>
</Service>
</EventLog>
</MessagePayload>
</StandardOutput>


```

#### 4.5.3.1.2 Sample ERROR response for submitMeterData request

```

<?xml version="1.0" encoding="UTF-8"?>
<StandardOutput xmlns="http://www.caiso.com/soa/StandardOutput_v1.xsd#">
    <MessageHeader>
        <TimeDate>2016-03-07T12:51:08.774+00:00</TimeDate>
        <Source>stlmt</Source>
        <Version>v20160301</Version>
    </MessageHeader>
    <MessagePayload>
        <EventLog>
            <Event>
                <creationDateTime>2016-04-07T22:47:55.754Z</creationDateTime>
                <description>Invalid XML</description>
                <id>0198514e-6b53-41a1-9d6c-1ab09dc84926</id>
                <result>Error</result>
            </Event>
        </Service>
            <id>99ad2c93-2681-45b0-bf5e-4aba80326ff5</id>
            <name>submitMeterData_v1</name>
        </Service>
    </EventLog>
</MessagePayload>
</StandardOutput>

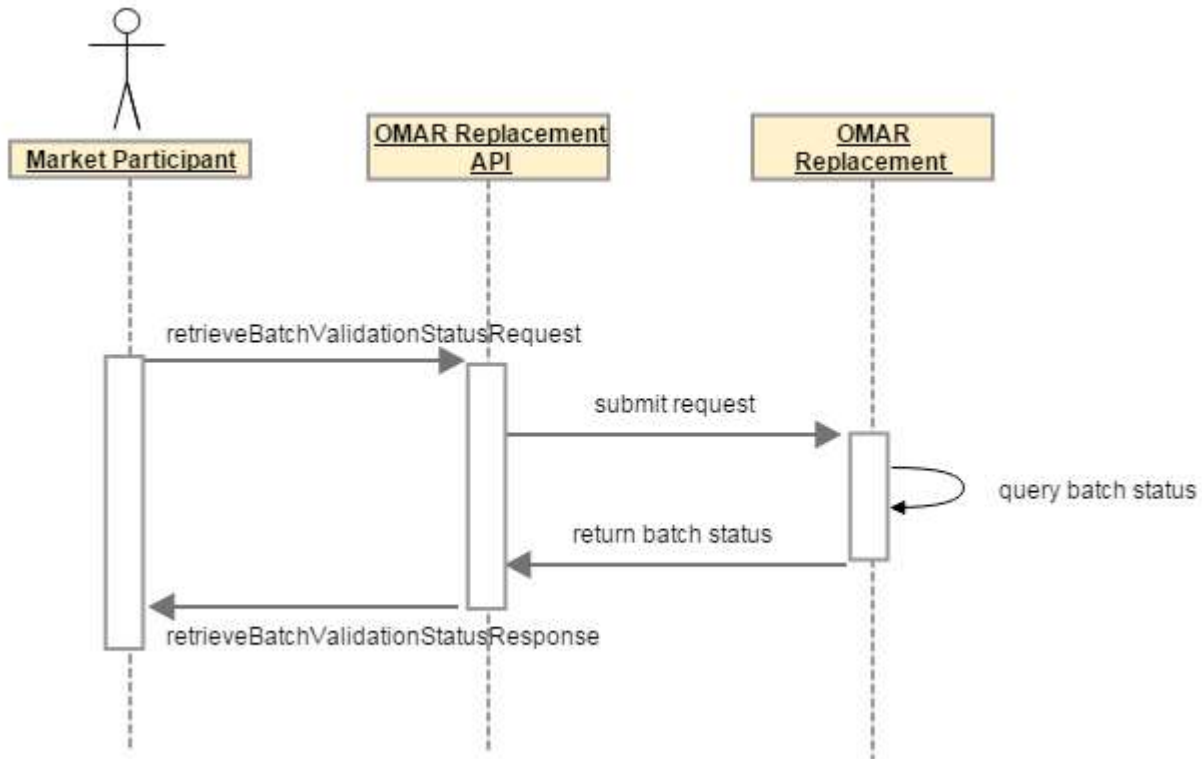
```

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## 5. RetrieveBatchValidationStatus

### 5.1 Use Model


The diagram below shows the sequence for retrieveBatchValidationStatus



### 5.2 Operation Details

The service has *retrieveBatchValidationStatus\_v1* operation with three message types. All input and output messages are in XML format.

Operation	Message Types	Message	WSDL	XSD
retrieveBatchValidationStatus_v1	Input	retrieveBatchValidationStatusRequest	retrieveBatchValidationStatus_v1.wsdl	BatchValidationStatus_v1.xsd

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	Output	retrieveBatchValidationStatusResponse	retrieveBatchValidationStatus_v1_DocAttach.wSDL	BatchValidationStatus_v1.xsd
	Fault	faultReturnTyped		StandardOutput_v1.xsd

### 5.3 WSDL (retrieveBatchValidationStatus\_v1.wsdl)

- retrieveBatchValidationStatus\_v1.wsdl – Used for normal SOAP messaging
- retrieveBatchValidationStatus\_v1\_DocAttach.wsdl – Used when .NET is the source of processing

The WSDL can be found at the following location:

Please refer to the latest version of the artifacts found under the technical specifications.

### 5.4 Message Type

retrieveBatchValidationStatusRequest

#### 5.4.1 Element Table

Element	Data Description	Type/Length	Req'd
<b>MessageHeader</b>			
TimeDate	Application level relevant time and date for when this instance of the message was produced, in GMT Time format	datetime	No
Source	Source system which provides data for this service	String	No
Version	Date reflecting the release this latest version update was related to.  Valid value is: <b>v20160301</b>	String	Yes
<b>MessagePayload (required)</b>			
<b>MessagePayload.BatchStatus (optional)</b>			
mRID	This represents the batch ID of a request that was generated by the system and sent back to the user for submission of a request	String	Yes
creationTime	Date/time of status creation in GMT format	datetime	No

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Element	Data Description	Type/Length	Req'd
description	<p>Description of batch status</p> <p>There are 4 values for status: SUCCESS, ERROR, WARNING, IN_PROCESS, and PENDING.</p> <p>Once the batch is submitted, the status is set to "PENDING". If you query during the time the application is processing the batch, you will get "IN_PROCESS" status.</p> <p>Once the processing is complete, the status will change to "SUCCESS" or "ERROR" or "WARNING".</p> <p>If the status is SUCCESS, all data submitted in that batch has been accepted.</p> <p>If the status is ERROR, all data submitted in the batch has been rejected.</p> <p>If the status is WARNING, all data submitted in the batch has been accepted but there are meter values submitted that exceed the PMAX of a resource. This is generated as an alert.</p>	String	No
<b>MessagePayload.DistributedEnergyResourceContainer (optional) (0 to unbounded occurrences)</b>			
mRID	Master resource identifier of the distributed energy resource container (also referred to in the DRS system as the location) – not relevant to this specification, but used for submission of DR locations	String	No
name	Name of the location – not relevant to this specification	String	No
<b>MessagePayload.DistributedEnergyResourceContainer.ErrorLog (required) – reasons for error in locations</b>			
mRID	Master resource identifier of the error (Error Code)	String	No
startTime	Start time of the error in GMT	datetime	No
endTime	End time of the error in GMT	datetime	No
errMessage	error message	String	Yes
errPriority	Priority number for the error message, default is 0	integer	Yes
logTimeStamp	Date time when the error was created	datetime	Yes
<b>MessagePayload.DemandResponseRegistration (optional) (0 to unbounded occurrences)</b>			



Element	Data Description	Type/Length	Req'd
mRID	Master resource identifier of the registration aka Registration ID	String	No
name	Name of the registration	String	No
<b>MessagePayload.DemandResponseRegistration.ErrorLog(required) – reasons for error in batch</b>			
mRID	Master resource identifier of the error (Error Code)	String	No
startTime	Start time of the error in GMT	datetime	No
endTime	End time of the error in GMT	datetime	No
errMessage	error message	String	Yes
errPriority	Priority number for the error message, default is 0	integer	Yes
logTimeStamp	Date time when the error was created in GMT	datetime	Yes
<b>MessagePayload.ErrorLog (optional) – There can be some errors which are not associated with any resources in those situations this element will be used. For example, when batch payload fails xsd schema validations</b>			
mRID	Master resource identifier of the Error (Error Code)	String	No
startTime	Start time of the error in GMT	datetime	No
endTime	End time of the error in GMT	datetime	No
errMessage	error message	String	Yes
errPriority	Priority number for the error message, default is 0.	integer	Yes
logTimeStamp	Date time when the error was created in GMT	datetime	Yes
<b>MessagePayload.RegisteredResource.RegisteredGenerator (Optional)</b>			
mRID	Master resource identifier of the registered generator resource as specified in masterfile	String	No
name	Name of the resource	String	No
<b>MessagePayload.RegisteredResource.RegisteredInterTie (Optional)</b>			
mRID	Master resource identifier of the registered intertie resource as specified in Masterfile <b>Note: This class will not be used in the current implementation and is included fo potential future use.</b>	String	No
name	Name of the resource	String	No
<b>MessagePayload.RegisteredResource.RegisteredLoad (Optional)</b>			
mRID	Master resource identifier of the registered load resource as specified in masterfile	String	No



Element	Data Description	Type/Length	Req'd
name	Name of the resource	String	No
<b>MessagePayload.RegisteredResource.Flowgate (Optional)</b>			
mRID	Master resource identifier of the flowgate resource as provided in the master file  <b>A flowgate is defined as any schedule flow between two substations. In the metering space, an intertie and/or citigate is referred to as a flowgate.</b>	String	N
name	Name of the resource	String	No
<b>MessagePayload.RegisteredResource.Measurements (Optional)</b>			
measurementType	Type of the measurement.  <b>Valid values are: LOAD or GEN or MBMA or CBL or TMNT or BASE*</b>  <b>Meter Before Meter After (MBMA), Baseline Load Data (CBL) and Treatment Group Load Data (TMNT) can only be used upon ESDER 2 project activation for DRS Replacement. *Calculated Customer Load Baseline Data (BASE) can be submitted upon ESDER 3A project activation. Meter data submitted with CBL or TMNT or BASE measurement types cannot be retrieved using the API or the UI. This is only used for internal auditing purposes.</b>  Measurement types are the same as channel ID in current metering solution. LOAD is channel 1, GEN is channel 4 and MBMA is channel 9.	String	Yes
<b>MessagePayload.RegisteredResource.Measurements.MeasurementValue</b>			
intervalEndTime	End Datetime in GMT of the interval for which the meter value is being submitted or retrieved. This is interval ending.	dateTime	Yes
<b>MessagePayload.RegisteredResource.ErrorLog(one to many occurrences) – reasons for error in batch</b>			
mRID	Master resource identifier of the error (Error Code)	String	No
startTime	Start time of the error in GMT This element will not be populated	datetime	No
endTime	End time of the error in GMT This element will not be populated	datetime	No
errMessage	error message	String	Yes
errPriority	Priority number for the error message Default is 0.	integer	Yes

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Element	Data Description	Type/ Length	Req'd
logTimeStamp	Date time when the error was created in GMT	datetime	Yes

### 5.4.2 Schema (BatchValidationStatus\_v1.xsd)

The XSD can be found at the following location:  
Please refer to the latest version of the artifacts found under the technical specifications.

### 5.4.3 Example XML File (BatchValidationStatus\_v1.xml)

#### 5.4.3.1 Requests


##### 5.4.3.1.1 Sample for Request for Batch Validation Status for Batch Id

```
<? xml version="1.0" encoding="UTF-8"?>
<BatchValidationStatus
  xmlns="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#
BatchValidationStatus_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <BatchStatus>
      <mRID>232434</mRID>
    </BatchStatus>
  </MessagePayload>
</BatchValidationStatus>
```

#### 5.4.3.2 Responses

##### 5.4.3.2.1 Sample for Response for Batch Validation Status for Batch Id: SUCCESS

```
<? xml version="1.0" encoding="UTF-8"?>
<BatchValidationStatus
  xmlns="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#
BatchValidationStatus_v1.xsd">
```

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```

<MessageHeader>
  <TimeDate>2014-11-13T19:32:45.879+00:00</TimeDate>
  <Source>String</Source>
  <Version>v20160301</Version>
</MessageHeader>
<MessagePayload>
  <BatchStatus>
    <mRID>232434</mRID>
    <description>SUCCESS</description>
    <creationTime>2014-11-13T19:32:45.879+00:00</creationTime>
  </BatchStatus>
</MessagePayload>
</BatchValidationStatus>

```

#### 5.4.3.2.2 Sample for Response for Batch Validation Status for Batch Id : IN\_PROCESS

```

<? xml version="1.0" encoding="UTF-8"?>
<BatchValidationStatus
  xmlns="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#
BatchValidationStatus_v1.xsd">
  <MessageHeader>
    <TimeDate>2014-11-13T19:32:45.879+00:00</TimeDate>
    <Source>String</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <BatchStatus>
      <mRID>232434</mRID>
      <description>IN_PROCESS</description>
      <creationTime>2014-11-13T19:32:45.879+00:00</creationTime>
    </BatchStatus>
  </MessagePayload>
</BatchValidationStatus>

```

#### 5.4.3.2.3 Sample for Response for Batch Validation Status for Batch Id: ERROR MessagePayload.ErrorLog


This is the example for MessagePayload.ErrorLog object.

```

<? xml version="1.0" encoding="UTF-8"?>
<BatchValidationStatus
  xmlns="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

```



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```

xsi:schemaLocation="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#
BatchValidationStatus_v1.xsd "
<MessageHeader>
  <TimeDate>2001-12-31T12:00:00</TimeDate>
  <Source>Source</Source>
  <Version>v20160301</Version>
</MessageHeader>
<MessagePayload>
  <BatchStatus>
    <mRID>232434</mRID>
    <description>ERROR</description>
    <creationTime>2001-12-31T12:00:00</creationTime>
  </BatchStatus>
  <ErrorLog>
    <mRID>1000</mRID>
    <endTime>2001-12-31T12:00:00</endTime>
    <errMessage>Invalid XML Schema</errMessage>
    <errPriority>0</errPriority>
    <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
    <startTime>2001-12-31T12:00:00</startTime>
  </ErrorLog>
</MessagePayload>
</BatchValidationStatus>


```

#### 5.4.3.2.4 Sample for Response for Batch Validation Status for Batch Id: ERROR + GEN

```

<? xml version="1.0" encoding="UTF-8"?>
<BatchValidationStatus
  xmlns="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#
BatchValidationStatus_v1.xsd "
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <BatchStatus>
      <mRID>232434</mRID>
      <description>ERROR</description>
      <creationTime>2001-12-31T12:00:00</creationTime>
    </BatchStatus>
    <RegisteredResource>
      <Measurements>
        <measurementType>GEN</measurementType>
      </Measurements>
    </RegisteredResource>
  </MessagePayload>
</BatchValidationStatus>


```

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```

        <MeasurementValue>
            <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        </MeasurementValue>
    </Measurements>
    <RegisteredGenerator>
        <mRID>RES_001</mRID>
        <name>RES_001</name>
    </RegisteredGenerator>
    <ErrorLog>
        <mRID>1005</mRID>
        <endTime>2001-12-31T12:00:00</endTime>
        <errorMessage>versionTag should not be populated for
submission</errorMessage>
        <errPriority>0</errPriority>
        <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
        <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
    <ErrorLog>
        <mRID>1006</mRID>
        <endTime>2001-12-31T12:00:00</endTime>
        <errorMessage>Empty Measurement Quality </errorMessage>
        <errPriority>0</errPriority>
        <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
        <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
</RegisteredResource>
<RegisteredResource>
    <Measurements>
        <measurementType>GEN</measurementType>
        <MeasurementValue>
            <intervalEndTime>2001-12-31T14:00:00Z</intervalEndTime>
        </MeasurementValue>
    </Measurements>
    <RegisteredGenerator>
        <mRID>RES_002</mRID>
        <name>RES_002</name>
    </RegisteredGenerator>
    <ErrorLog>
        <mRID>1004</mRID>
        <endTime>2001-12-31T12:00:00</endTime>
        <errorMessage>Invalid Resource</errorMessage>
        <errPriority>0</errPriority>
        <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
        <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
    <ErrorLog>
        <mRID>1005</mRID>
        <endTime>2001-12-31T12:00:00</endTime>

```

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```

    <errMessage>versionTag should not be populated for
submission</errMessage>
    <errPriority>0</errPriority>
    <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
    <startTime>2001-12-31T12:00:00</startTime>
  </ErrorLog>
</RegisteredResource>
</MessagePayload>
</BatchValidationStatus>


```

#### 5.4.3.2.5 Sample for Response for Batch Validation Status for Batch Id: ERROR + LOAD + GEN

```

<? xml version="1.0" encoding="UTF-8"?>
<BatchValidationStatus
  xmlns="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#
  BatchValidationStatus_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <BatchStatus>
      <mRID>232434</mRID>
      <description>ERROR</description>
      <creationTime>2001-12-31T12:00:00</creationTime>
    </BatchStatus>
    <RegisteredResource>
      <Measurements>
        <measurementType>GEN</measurementType>
        <MeasurementValue>
          <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
        </MeasurementValue>
      </Measurements>
      <RegisteredGenerator>
        <mRID>RES_001</mRID>
        <name>RES_001</name>
      </RegisteredGenerator>
      <ErrorLog>
        <mRID>1004</mRID>
        <endTime>2001-12-31T12:00:00</endTime>
        <errMessage>Invalid Resource</errMessage>
        <errPriority>0</errPriority>
        <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
      </ErrorLog>
    </RegisteredResource>
  </MessagePayload>
</BatchValidationStatus>

```

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```

        <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
</ErrorLog>
    <mRID>1006</mRID>
    <endTime>2001-12-31T12:00:00</endTime>
    <errorMessage>Empty Measurement Quality </errorMessage>
    <errPriority>0</errPriority>
    <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
    <startTime>2001-12-31T12:00:00</startTime>
</ErrorLog>
</RegisteredResource>
<RegisteredResource>
    <Measurements>
        <measurementType>LOAD</measurementType>
        <MeasurementValue>
            <intervalEndTime>2001-12-31T14:00:00Z</intervalEndTime>
        </MeasurementValue>
    </Measurements>
    <RegisteredLoad>
        <mRID>LDRES_004</mRID>
        <name>LDRES_004</name>
    </RegisteredLoad>
</ErrorLog>
    <mRID>1004</mRID>
    <endTime>2001-12-31T12:00:00</endTime>
    <errorMessage>Invalid Resource</errorMessage>
    <errPriority>0</errPriority>
    <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
    <startTime>2001-12-31T12:00:00</startTime>
</ErrorLog>
<ErrorLog>
    <mRID>1005</mRID>
    <endTime>2001-12-31T12:00:00</endTime>
    <errorMessage>versionTag should not be populated for
submission</errorMessage>
    <errPriority>0</errPriority>
    <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
    <startTime>2001-12-31T12:00:00</startTime>
</ErrorLog>
</RegisteredResource>
</MessagePayload>
</BatchValidationStatus>


```

#### 5.4.3.2.6 Sample for Response for Batch Validation Status for Batch Id: ERROR + FLOW GATE

```

<? xml version="1.0" encoding="UTF-8"?>
<BatchValidationStatus
    xmlns="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#"

```

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```


xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#
BatchValidationStatus_v1.xsd ">
<MessageHeader>
  <TimeDate>2001-12-31T12:00:00</TimeDate>
  <Source>Source</Source>
  <Version>v20160301</Version>
</MessageHeader>
<MessagePayload>
  <BatchStatus>
    <mRID>232434</mRID>
    <description>ERROR</description>
    <creationTime>2001-12-31T12:00:00</creationTime>
  </BatchStatus>
  <RegisteredResource>
    <Flowgate>
      <mRID>FG_RES_001</mRID>
      <name>FG_RES_001</name>
    </Flowgate>
    <Measurements>
      <measurementType>GEN</measurementType>
      <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
      </MeasurementValue>
    </Measurements>
    <ErrorLog>
      <mRID>1004</mRID>
      <endTime>2001-12-31T12:00:00</endTime>
      <errorMessage>Invalid Resource</errorMessage>
      <errPriority>0</errPriority>
      <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
      <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
    <ErrorLog>
      <mRID>1006</mRID>
      <endTime>2001-12-31T12:00:00</endTime>
      <errorMessage>Empty Measurement Quality </errorMessage>
      <errPriority>0</errPriority>
      <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
      <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
  </RegisteredResource>
</RegisteredResource>
  <Flowgate>
    <mRID>FG_RES_002</mRID>
    <name>FG_RES_002</name>
  </Flowgate>
  <Measurements>

```

---

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```

        <measurementType>LOAD</measurementType>
        <MeasurementValue>
            <intervalEndTime>2001-12-31T14:00:00Z</intervalEndTime>
        </MeasurementValue>
    </Measurements>
    <ErrorLog>
        <mRID>1004</mRID>
        <endTime>2001-12-31T12:00:00</endTime>
        <errorMessage>Invalid Resource</errorMessage>
        <errPriority>0</errPriority>
        <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
        <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
    <ErrorLog>
        <mRID>1006</mRID>
        <endTime>2001-12-31T12:00:00</endTime>
        <errorMessage>Empty Measurement Quality</errorMessage>
        <errPriority>0</errPriority>
        <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
        <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
    </RegisteredResource>
</MessagePayload>
</BatchValidationStatus>


```

#### 5.4.3.2.7 Sample for Response for Batch Validation Status for Batch Id: WARNING + GEN

```

<? xml version="1.0" encoding="UTF-8"?>
<BatchValidationStatus
  xmlns="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/BatchValidationStatus_v1.xsd#
  BatchValidationStatus_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <BatchStatus>
      <mRID>232434</mRID>
      <description>WARNING</description>
      <creationTime>2001-12-31T12:00:00</creationTime>
    </BatchStatus>
  </RegisteredResource>


```

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```

    <Measurements>
      <measurementType>GEN</measurementType>
      <MeasurementValue>
        <intervalEndTime>2001-12-31T12:00:00Z</intervalEndTime>
      </MeasurementValue>
    </Measurements>
    <RegisteredGenerator>
      <mRID>RES_001</mRID>
    </RegisteredGenerator>
    <ErrorLog>
      <mRID>1028</mRID>
      <endTime>2001-12-31T12:00:00</endTime>
      <errorMessage>Meter value of 3 MWh exceeds the PMAx of 1
MWh</errorMessage>
      <errPriority>0</errPriority>
      <logTimeStamp>2001-12-31T12:00:00</logTimeStamp>
      <startTime>2001-12-31T12:00:00</startTime>
    </ErrorLog>
  </RegisteredResource>
</MessagePayload>
</BatchValidationStatus>

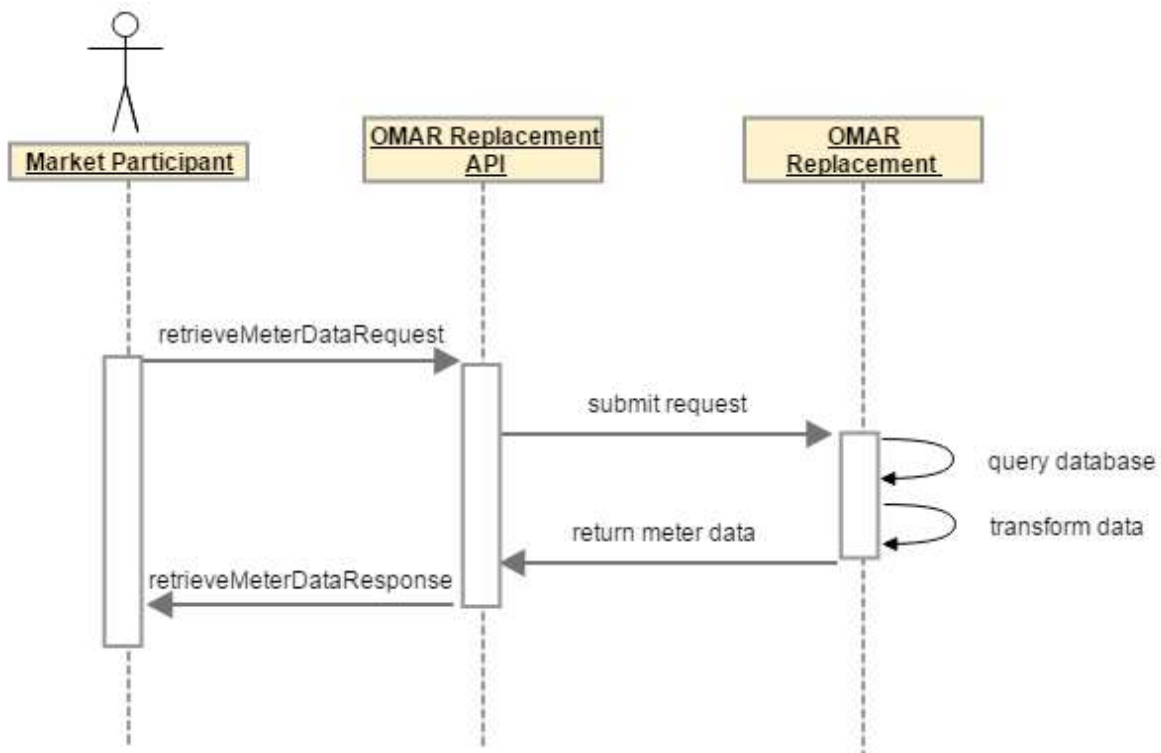
```

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## 6. RetrieveMeterData

### 6.1 Use Model

The diagram below shows the sequence for retrieveMeterData





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## 6.2 Operation Details

The service has *retrieveMeterData\_v1* operation with three message types. All input and output messages are in XML format.

Operation	Message Types	Message	WSDL	XSD
retrieveMeterData_v1	Input	retrieveMeterDataRequest	retrieveMeterData_v1.wsdl	RequestMeterData_v1.xsd
	Output	retrieveMeterDataResponse	retrieveMeterData_v1_DocAttach.wsdl	MeterData_v1.xsd
	Fault	faultReturnResponse		StandardOutput_v1.xsd

The structure of the request for retrieving the meter data information is described below in 5.4. The response structure (MeterData\_v1.xsd) and StandardOutput\_v1.xsd have been described earlier in this document in sections 4.4 and 4.5.

## 6.3 WSDL (retrieveMeterData\_v1.wsdl)

retrieveMeterData\_v1.wsdl

- retrieveMeterData\_v1.wsdl – Used for normal SOAP messaging
- retrieveMeterData\_v1\_DocAttach.wsdl – Used when .NET is the source of processing

The WSDL can be found at the following location:


[Please refer to the latest version of the artifacts found under the technical specifications.](#)

## 6.4 Message Type

retrieveMeterDataRequest

### 6.4.1 Element Table

Element	Data Description	Type/Length	Req'd
<b>MessageHeader (Optional)</b>			

 <b>California ISO</b>	<b>Technology</b>	<b>Template Version:</b>	[Template Version]
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Element	Data Description	Type/ Length	Req'd
TimeDate	Application level relevant time and date for when this instance of the message was produced, in Pacific Prevailing Time format	datetime	No
Source	Source system which provides data for this service	String	No
Version	Date reflecting the release this latest version update was related to.  Valid value is: <b>v20160301</b>	String	Yes
<b>MessagePayload (required)</b>			
<b>MessagePayload.MeterDataRequest(one or more occurrences)</b>			
requestType	Type of request. <b>Valid values are: METER_DATA or DR_CALCULATED_DATA</b> The type 'METER_DATA' returns information related to the meter data. DR_CALCULATED_DATA relates information regarding the baseline and performance calculation and is not effective at this time. Any request with DR_CALCULATED_DATA will be rejected.	String	Yes
updateSinceDateTim e	This field can be used to retrieve incremental changes by specifying the datetime since when the records were updated.	DateTime	No
<b>MessagePayload.MeterDataRequest.DemandResponseRegistration (optional, for demand response only)</b>			
mRID	Master resource identifier of the registration (Registration ID)	String	Yes
<b>MessagePayload.MeterDataRequest.Measurement (optional)</b>			

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Element	Data Description	Type/Length	Req'd
measurementType	<p>Type of the measurement.</p> <p><b>Valid values are: LOAD or GEN or MBMA or CBL or TMNT or BASE*</b></p> <p><b>Meter Before Meter After (MBMA), Baseline Load Data (CBL) and Treatment Group Load Data (TMNT) can only be used upon ESDER 2 project activation for DRS Replacement. *Calculated Customer Load Baseline Data (BASE) can be submitted upon ESDER 3A project activation.</b></p> <p><b>Meter data submitted with CBL or TMNT or BASE measurement types cannot be retrieved using the API or the UI. This is only used for internal auditing purposes.</b></p> <p>Measurement types are the same as channel ID in current metering solution. LOAD is channel 1, GEN is channel 4 and MBMA is channel 9.</p>	String	No
timeIntervalLength	<p>Interval length of the trading time in minutes.</p> <p><b>Valid values are: 5, 10, 15 or 60</b></p> <p>Data submitted in any granularity will be saved in the database in 5 minute interval length. If a user specifies a value other than 5 in this field, the data will be aggregated to the requested granularity.</p> <p>If the user does not specify a value, the default is what is specified in the master file for that particular resource.</p>	Integer	No
unitMultiplier	<p>The unit multiplier of the measured quantity.</p> <p><b>Valid values are: M for Megawatt or k for kilowatt</b></p> <p>Values are case sensitive.</p>	Enumeration	No
unitSymbol	<p>The unit of measure of the measured quantity.</p> <p><b>Valid value is: Wh</b></p> <p>Value is case sensitive.</p>	Enumeration	No

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Element	Data Description	Type/ Length	Req'd
versionTag	<p>The version of the submission. <b>Will be populated only in the retrieve response. Cannot be specified for submissions.</b></p> <p><b>Valid values are: CURRENT, PREVIOUS or HISTORY</b></p> <p>HISTORY can be used to retrieve all versions. If no version is specified, then the default is CURRENT.</p> <p>The application will maintain two versions for a given data set: CURRENT and PREVIOUS. All prior versions will not be maintained.</p> <p>Request for a version of HISTORY will result in a response of meter data that was used in each of the various settlements runs, which are T+3B, T+12B, T+55B, T+9M, T+18M, T+35M, T+36M, in addition to CURRENT and PREVIOUS</p>	String	No
<b>MessagePayload.MeterDataRequest.rangePeriod</b>			
end	End date and time of interval in GMT format for which data is requested. End limit of End Datetime in GMT of the interval for which the meter value is being retrieved. This is interval ending.	datetime	Yes
start	Start date and time of interval in GMT format for which data is requested. Start limit of End Datetime in GMT of the interval for which the meter value is being retrieved. This is interval ending.	datetime	Yes
<b>MessagePayload.MeterDataRequest.RegisteredGenerator *(one or more occurrences)</b>			
mRID	<p>Master resource identifier of the generator resources as specified by master file.</p> <p>Keyword ALL can be used to retrieve data for all generator resources. Request for "ALL" resources cannot be combined with individual resource IDs in the same MeterDataRequest class.</p>	String	Yes*
<b>MessagePayload.MeterDataRequest.RegisteredInterTie * (one or more occurrences)</b>			
mRID	<p>Master resource identifier of the intertie resource as provided in the master file</p> <p>Keyword ALL can be used to retrieve data for all intertie resources</p> <p><b>Note: This class will not be used in the current implementation and is included fo potential future use.</b></p>	String	Yes*
<b>MessagePayload.MeterDataRequest.RegisteredLoad * (one or more occurrences)</b>			

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Element	Data Description	Type/Length	Req'd
mRID	Master resource identifier of the load resource as provided in the master file  Keyword ALL can be used to retrieve data for all load resources. Request for "ALL" resources cannot be combined with individual resource IDs in the same MeterDataRequest class.	String	Yes*
<b>MessagePayload.MeterDataRequest.Flowgate * (one or more occurrences)</b>			
mRID	Master resource identifier of the flowgate resource as provided in the master file.  <b>A flowgate is defined as any schedule flow between two substations. In the metering space, an intertie and/or citigate is referred to as a flowgate.</b>  Keyword ALL can be used to retrieve data for all flowgate resources. Request for "ALL" resources cannot be combined with individual resource IDs in the same MeterDataRequest class.	String	Yes*
<b>MessagePayload.MeterDataRequest.SchedulingCoordinator</b>			
scid	This field can be used for data retrieval for a specific SCID or ACL Group	String	No

\*Only one of these four elements is required for a specific request

#### 6.4.2 Schema (RequestMeterData\_v1.xsd)

The XSD can be found at the following location:

Please refer to the latest version of the artifacts found under the technical specifications.

#### 6.4.3 Example XML File (RequestMeterData\_v1.xml)


##### 6.4.3.1 Requests

##### 6.4.3.1.1 Sample request to retrieve meter data based on a Time Range and PREVIOUS +GEN

```
<? xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.caiso.com/soa/RequestMeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
  <MessageHeader>
```

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```

    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
</MessageHeader>
<MessagePayload>
  <MeterDataRequest>
    <requestType>METER_DATA</requestType>
    <Measurement>
      <measurementType>GEN</measurementType>
      <unitMultiplier>M</unitMultiplier>
      <unitSymbol>Wh</unitSymbol>
      <versionTag>PREVIOUS</versionTag>
    </Measurement>
    <RegisteredGenerator>
      <mRID>Gen_Res_001</mRID>
    </RegisteredGenerator>
    <rangePeriod>
      <end>2015-06-30T12:00:00Z</end>
      <start>2015-01-31T12:05:00Z</start>
    </rangePeriod>
  </MeterDataRequest>
</MessagePayload>
</RequestMeterData>


```

#### 6.4.3.1.2 Sample request to retrieve meter data based on a Time Range and CURRENT + LOAD

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.aiso.com/soa/RequestMeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.aiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterDataRequest>
      <requestType>METER_DATA</requestType>
      <Measurement>
        <measurementType>LOAD</measurementType>
        <unitMultiplier>M</unitMultiplier>
        <unitSymbol>Wh</unitSymbol>
        <versionTag>CURRENT</versionTag>
      </Measurement>
      <RegisteredLoad>
        <mRID>ld_Res_001</mRID>

```

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```

        </RegisteredLoad>
        <rangePeriod>
            <end>2015-06-30T12:00:00Z</end>
            <start>2015-01-31T12:05:00Z</start>
        </rangePeriod>
    </MeterDataRequest>
</MessagePayload>
</RequestMeterData>

```

#### 6.4.3.1.3 Sample request to retrieve meter data based on a Time Range and CURRENT + FLOW GATE

```

<? xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.caiso.com/soa/RequestMeterData_v1.xsd#"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.caiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
    <MessageHeader>
        <TimeDate>2001-12-31T12:00:00</TimeDate>
        <Source>Source</Source>
        <Version>v20160301</Version>
    </MessageHeader>
    <MessagePayload>
        <MeterDataRequest>
            <requestType>METER_DATA</requestType>
            <Measurement>
                <measurementType>GEN</measurementType>
                <unitMultiplier>M</unitMultiplier>
                <unitSymbol>Wh</unitSymbol>
                <versionTag>CURRENT</versionTag>
            </Measurement>
            <Flowgate>
                <mRID>FG_Res_001</mRID>
            </Flowgate>
            <rangePeriod>
                <end>2015-06-30T12:00:00Z</end>
                <start>2015-01-31T12:00:00Z</start>
            </rangePeriod>
        </MeterDataRequest>
    </MessagePayload>
</RequestMeterData>


```

#### 6.4.3.1.4 Sample request to retrieve meter data based on a Time Range and HISTORY + GEN + Measurement Type GEN

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.caiso.com/soa/RequestMeterData_v1.xsd#"

```

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```

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.caiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterDataRequest>
      <requestType>METER_DATA</requestType>
      <Measurement>
        <measurementType>GEN</measurementType>
        <unitMultiplier>M</unitMultiplier>
        <unitSymbol>Wh</unitSymbol>
        <versionTag>HISTORY</versionTag>
      </Measurement>
      <RegisteredGenerator>
        <mRID>Gen_Res_001</mRID>
      </RegisteredGenerator>
      <rangePeriod>
        <end>2015-06-30T12:00:00Z</end>
        <start>2015-01-31T12:00:00Z</start>
      </rangePeriod>
    </MeterDataRequest>
  </MessagePayload>
</RequestMeterData>

```


*6.4.3.1.5 Sample request to retrieve meter data based on a Time Range and HISTORY + LOAD + Measurement Type LOAD*

```

<? xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.caiso.com/soa/RequestMeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterDataRequest>
      <requestType>METER_DATA</requestType>
      <Measurement>
        <measurementType>LOAD</measurementType>
        <unitMultiplier>M</unitMultiplier>

```



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```

        <unitSymbol>Wh</unitSymbol>
        <versionTag>HISTORY</versionTag>
    </Measurement>
    <RegisteredLoad>
        <mRID>LD_Res_001</mRID>
    </RegisteredLoad>
    <rangePeriod>
        <end>2015-06-30T12:00:00Z</end>
        <start>2015-01-31T12:00:00Z</start>
    </rangePeriod>
    </MeterDataRequest>
</MessagePayload>
</RequestMeterData>

```


#### 6.4.3.1.6 Sample request to retrieve meter data based on a Time Range + ALL Generators + SC ID

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.caiso.com/soa/RequestMeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterDataRequest>
      <requestType>METER_DATA</requestType>

      <RegisteredGenerator>
        <mRID>ALL</mRID>
      </RegisteredGenerator>
      <rangePeriod>
        <end>2015-01-02T03:00:00Z</end>
        <start>2015-01-02T02:00:00Z</start>
      </rangePeriod>
      <SchedulingCoordinator>
        <scid>SCID1</scid>
      </SchedulingCoordinator>
    </MeterDataRequest>
  </MessagePayload>
</RequestMeterData>

```


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*6.4.3.1.7 Sample request to retrieve meter data based on a Time Range and HISTORY + GEN + Measurement Type GEN + timeIntervalLength*

```
<?xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.caiso.com/soa/RequestMeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterDataRequest>
      <requestType>METER_DATA</requestType>
      <Measurement>
        <measurementType>GEN</measurementType>
        <timeIntervalLength>60</timeIntervalLength>
        <unitMultiplier>M</unitMultiplier>
        <unitSymbol>Wh</unitSymbol>
        <versionTag>HISTORY</versionTag>
      </Measurement>
      <RegisteredGenerator>
        <mRID>Gen_Res_001</mRID>
      </RegisteredGenerator>
      <rangePeriod>
        <end>2015-06-30T12:00:00Z</end>
        <start>2015-01-31T12:00:00Z</start>
      </rangePeriod>
    </MeterDataRequest>
  </MessagePayload>
</RequestMeterData>
```

*6.4.3.1.8 Sample request to retrieve meter data based on a Time Range and HISTORY + GEN + Measurement Type GEN + timeIntervalLength + updateSinceDateTime*

```
<?xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.caiso.com/soa/RequestMeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
```

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```

<MeterDataRequest>
  <requestType>METER_DATA</requestType>
  <updateSinceDateTime>2016-10-30T12:00:00</updateSinceDateTime>
  <Measurement>
    <measurementType>GEN</measurementType>
    <timeIntervalLength>60</timeIntervalLength>
    <unitMultiplier>M</unitMultiplier>
    <unitSymbol>Wh</unitSymbol>
    <versionTag>HISTORY</versionTag>
  </Measurement>
  <RegisteredGenerator>
    <mRID>Gen_Res_001</mRID>
  </RegisteredGenerator>
  <rangePeriod>
    <end>2015-06-30T12:00:00Z</end>
    <start>2015-01-31T12:00:00Z</start>
  </rangePeriod>
</MeterDataRequest>
</MessagePayload>
</RequestMeterData>


```

*6.4.3.1.9 Sample request to retrieve meter data based on a Time Range and multiple resource IDs + Measurement Type GEN + timeIntervalLength + updateSinceDateTime*

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMeterData xmlns="http://www.caiso.com/soa/RequestMeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/RequestMeterData_v1.xsd#
RequestMeterData_v1.xsd ">
  <MessageHeader>
    <TimeDate>2001-12-31T12:00:00</TimeDate>
    <Source>Source</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterDataRequest>
      <requestType>METER_DATA</requestType>
      <updateSinceDateTime>2017-10-30T12:00:00</updateSinceDateTime>
      <Measurement>
        <measurementType>GEN</measurementType>
        <timeIntervalLength>60</timeIntervalLength>
        <unitMultiplier>M</unitMultiplier>
        <unitSymbol>Wh</unitSymbol>
        <versionTag>HISTORY</versionTag>
      </Measurement>
      <RegisteredGenerator>
        <mRID>Gen_Res_001</mRID>
      </RegisteredGenerator>
    </MeterDataRequest>
  </MessagePayload>
</RequestMeterData>

```

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```

    <RegisteredGenerator>
      <mRID>Gen_Res_002</mRID>
    </RegisteredGenerator>
    <RegisteredGenerator>
      <mRID>Gen_Res_003</mRID>
    </RegisteredGenerator>
    <RegisteredGenerator>
      <mRID>Gen_Res_004</mRID>
    </RegisteredGenerator>
    <rangePeriod>
      <end>2017-06-30T12:00:00Z</end>
      <start>2017-06-01T12:00:00Z</start>
    </rangePeriod>
  </MeterDataRequest>
</MessagePayload>
</RequestMeterData>

```

### 6.4.3.2 Responses

#### 6.4.3.2.1 Sample response for GEN measurement type + CURRENT


```

<?xml version="1.0" encoding="UTF-8"?>
<MeterData xmlns="http://www.caiso.com/soa/MeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/MeterData_v1.xsd# MeterData_v1.xsd">
  <MessageHeader>
    <TimeDate>2014-11-13T19:32:45.879+00:00</TimeDate>
    <Source>String</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterMeasurementData>

      <measurementType>GEN</measurementType>
      <timeIntervalLength>5</timeIntervalLength>
      <unitMultiplier>M</unitMultiplier>
      <unitSymbol>Wh</unitSymbol>

      <MeasurementValue>
        <intervalEndTime>2014-11-13T19:35:00Z</intervalEndTime>
        <meterValue>2</meterValue>
        <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
      </MeasurementValue>
    </MeterMeasurementData>
  </MessagePayload>
</MeterData>

```

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```

    <VersionInfo>
      <measurementQuality>ACTUAL</measurementQuality>
      <versionTag>CURRENT</versionTag>
    </VersionInfo>
  </MeasurementValue>
<MeasurementValue>
  <intervalEndTime>2014-11-13T19:40:00Z</intervalEndTime>
  <meterValue>22</meterValue>
  <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
  <VersionInfo>
    <measurementQuality>ACTUAL</measurementQuality>
    <versionTag>CURRENT</versionTag>
  </VersionInfo>
  </MeasurementValue>
<MeasurementValue>
  <intervalEndTime>2014-11-13T19:45:00Z</intervalEndTime>
  <meterValue>22</meterValue>
  <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
  <VersionInfo>
    <measurementQuality>ACTUAL</measurementQuality>
    <versionTag>CURRENT</versionTag>
  </VersionInfo>
</MeasurementValue>
<MeasurementValue>
  <intervalEndTime>2014-09-13T19:50:00Z</intervalEndTime>
  <meterValue>23</meterValue>
  <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
  <VersionInfo>
    <measurementQuality>ACTUAL</measurementQuality>
    <versionTag>CURRENT</versionTag>
  </VersionInfo>
</MeasurementValue>
<RegisteredGenerator>
  <mRID>GEN123</mRID>
</RegisteredGenerator>
</MeterMeasurementData>
</MessagePayload>
</MeterData>


```

#### 6.4.3.2.2 Sample response for LOAD measurement type: +PREVIOUS

```

<? xml version="1.0" encoding="UTF-8"?>
<MeterData xmlns="http://www.caiso.com/soa/MeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/MeterData_v1.xsd# MeterData_v1.xsd">
  <MessageHeader>
    <TimeDate>2014-11-13T19:32:45.879+00:00</TimeDate>
    <Source>String</Source>
    <Version>v20160301</Version>

```

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```

</MessageHeader>
<MessagePayload>
  <MeterMeasurementData>


    <measurementType>LOAD</measurementType>
    <timeIntervalLength>5</timeIntervalLength>
    <unitMultiplier>M</unitMultiplier>
    <unitSymbol>Wh</unitSymbol>

    <MeasurementValue>
      <intervalEndTime>2014-11-13T19:35:00Z</intervalEndTime>
      <meterValue>5</meterValue>
      <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
      <VersionInfo>
        <measurementQuality>ACTUAL</measurementQuality>
        <versionTag>PREVIOUS</versionTag>
      </VersionInfo>
    </MeasurementValue>
    <MeasurementValue>
      <intervalEndTime>2014-11-13T19:35:00Z</intervalEndTime>
      <meterValue>2</meterValue>
      <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
      <VersionInfo>
        <measurementQuality>ACTUAL</measurementQuality>
        <versionTag>PREVIOUS</versionTag>
      </VersionInfo>
    </MeasurementValue>
    <MeasurementValue>
      <intervalEndTime>2014-11-13T19:35:00Z</intervalEndTime>
      <meterValue>4</meterValue>
      <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
      <VersionInfo>
        <measurementQuality>ACTUAL</measurementQuality>
        <versionTag>PREVIOUS</versionTag>
      </VersionInfo>
    </MeasurementValue>
    <RegisteredLoad>
      <mRID>LD_RES_123</mRID>
    </RegisteredLoad>
  </MeterMeasurementData>
</MessagePayload>
</MeterData>

```

*6.4.3.2.3 Sample response for Resource Type: Flow Gate + Measurement Type :Gen +Version: CURRENT*

```
<?xml version="1.0" encoding="UTF-8"?>
```

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```

<MeterData xmlns="http://www.caiso.com/soa/MeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/MeterData_v1.xsd# MeterData_v1.xsd">
  <MessageHeader>
    <TimeDate>2014-11-13T19:32:45.879+00:00</TimeDate>
    <Source>String</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterMeasurementData>

      <measurementType>GEN</measurementType>
      <timeIntervalLength>5</timeIntervalLength>
      <unitMultiplier>M</unitMultiplier>
      <unitSymbol>Wh</unitSymbol>


      <MeasurementValue>
        <intervalEndTime>2014-11-13T19:35:00Z</intervalEndTime>
        <meterValue>2</meterValue>
        <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
          <versionTag>CURRENT</versionTag>
        </VersionInfo>
      </MeasurementValue>
      <MeasurementValue>
        <intervalEndTime>2014-11-13T19:40:00Z</intervalEndTime>
        <meterValue>22</meterValue>
        <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
          <versionTag>CURRENT</versionTag>
        </VersionInfo>
      </MeasurementValue>
      <MeasurementValue>
        <intervalEndTime>2014-11-13T19:45:00Z</intervalEndTime>
        <meterValue>22</meterValue>
        <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
          <versionTag>CURRENT</versionTag>
        </VersionInfo>
      </MeasurementValue>
      <MeasurementValue>
        <intervalEndTime>2014-09-13T19:50:00Z</intervalEndTime>
        <meterValue>23</meterValue>
        <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
          <versionTag>CURRENT</versionTag>
        </VersionInfo>
      </MeasurementValue>
    </MeterMeasurementData>
  </MessagePayload>
</MeterData>

```

---

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```

        </VersionInfo>
    </MeasurementValue>
    <Flowgate>
        <mRID>FG_RES_1234</mRID>
    </Flowgate>
    </MeterMeasurementData>
</MessagePayload>
</MeterData>

```

*6.4.3.2.4 Sample response for Resource Type:Generator + Measurement Type: Gen +Version :HISTORY*

```


<?xml version="1.0" encoding="UTF-8"?>
<MeterData xmlns="http://www.caiso.com/soa/MeterData_v1.xsd#"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.caiso.com/soa/MeterData_v1.xsd# MeterData_v1.xsd">
  <MessageHeader>
    <TimeDate>2014-11-13T19:32:45.879+00:00</TimeDate>
    <Source>String</Source>
    <Version>v20160301</Version>
  </MessageHeader>
  <MessagePayload>
    <MeterMeasurementData>

      <measurementType>GEN</measurementType>
      <timeIntervalLength>5</timeIntervalLength>
      <unitMultiplier>M</unitMultiplier>
      <unitSymbol>Wh</unitSymbol>

      <MeasurementValue>
        <intervalEndTime>2014-11-13T19:35:00Z</intervalEndTime>
        <meterValue>2</meterValue>
        <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
          <versionTag>CURRENT</versionTag>
        </VersionInfo>
      </MeasurementValue>
      <MeasurementValue>
        <intervalEndTime>2014-11-13T19:35:00Z</intervalEndTime>
        <meterValue>22</meterValue>
        <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
        <VersionInfo>
          <measurementQuality>ACTUAL</measurementQuality>
          <versionTag>PREVIOUS</versionTag>
        </VersionInfo>
      </MeasurementValue>
    </MeterMeasurementData>
  </MessagePayload>
</MeterData>

```




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```

    <MeasurementValue>
      <intervalEndTime>2014-11-13T19:35:00Z</intervalEndTime>
      <meterValue>22</meterValue>
      <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
      <VersionInfo>
        <measurementQuality>ACTUAL</measurementQuality>
        <versionTag>T+3B</versionTag>
      </VersionInfo>
    </MeasurementValue>
    <MeasurementValue>
      <intervalEndTime>2014-09-13T19:35:00Z</intervalEndTime>
      <meterValue>23</meterValue>
      <timeStamp>2014-11-13T19:32:45.879+00:00</timeStamp>
      <VersionInfo>
        <measurementQuality>T+12B</measurementQuality>
        <versionTag>CURRENT</versionTag>
      </VersionInfo>
    </MeasurementValue>
    <RegisteredGenerator>
      <mRID>GEN123</mRID>
    </RegisteredGenerator>
  </MeterMeasurementData>
</MessagePayload>
</MeterData>

```

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## 7. Appendix – dateTime Data Type

The dateTime data type is used to specify a date and a time.

The dateTime is specified in the following form YYYY-MM-DDThh: mm:ss [(+|-) hh:mm:ss] where:


- YYYY** indicates the year
- MM** indicates the month
- DD** indicates the day
- T** indicates the start of the required time section
- hh** indicates the hour
- mm** indicates the minute
- ss** indicates the second
- + (plus) or - (minus)** to specify an offset from the UTC time

Sample dateTime format variations supported by OMAR Replacement API:

- 2016-01-26T07:00:00.000-00:00
- 2016-01-26T07:00:00Z

*Note that this version does not support more than 3 decimal places for milliseconds*

	<i>Daily -0000 offset</i>	
	<b>start</b>	<b>end</b>
<b>Daylight-Savings Time</b>	2014-10-15T07:00:00:00	2014-10-16T07:00:00:00
<b>Non Daylight-Savings Time</b>	2014-11-15T08:00:00:00	2014-11-16T08:00:00:00
<b>Short Day</b>	2014-03-09T08:00:00:00	2014-03-10T07:00:00:00
<b>Long Day</b>	2014-11-02T07:00:00:00	2014-11-03T08:00:00:00

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## 8. Appendix – Validation Errors


<b>ERROR CODE</b>	<b>ERROR MESSAGE</b>	<b>ERROR DESCRIPTION</b>
1001	Unexpected Error	Unhandled Exception
1002	Invalid XML	XSD validation errors
1003	Invalid File	One or many of the mandatory fields are missing in the attachment
1004	Invalid Resource	The resource ID being specified is not provisioned to the user for the given trade date
1005	SC submission of data for this resource is not allowed	The resource ID being submitted is not provisioned for SC submission
1006	Late Meter Data	Trade date submitted is beyond the later meter cutoff date
1007	Invalid Measurement Type	Valid values are LOAD or GEN or MBMA or CBL or TMNT or BASE
1008	Invalid Time Interval Length	Valid values are 5, 15 or 60 for submission and 5, 10, 15 or 60 for retrieve request
1009	Invalid time format	Interval End Time should be in GMT
1010	Interval End Time does not match with Time Interval Length	The granularity specified in the Interval Time Length field should match the granularity of the interval end time
1011	Invalid meter value precision	Valid precision for meter value is (16,8), ie. 8 digits before and after the decimal point
1012	Invalid measurement quality	Valid values are ACTUAL or ESTIMATED
1013	Version cannot be specified for meter data submission	Version field will only be populated for data retrieve request and response, but cannot be specified in the submission
1014	Invalid version requested	Valid values for retrieve request are CURRENT, PREVIOUS or HISTORY
1015	Invalid Resource type	The resource id is associated to a wrong XML element for resource type
1016	Duplicate data found	For a given resource id, and measurement quality, more than

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		one value found for a given interval end time
1017	Estimated data cannot be provided for this trade date	Estimated data can only be submitted for the recalculation statements until T+48B Midnight for a trade date
1018	DemandResponseRegistration should not be provided	Meter data for DR Resources are not allowed at this time
1019	Unexpected Security Error	Unhandled exception specific to auth service
1020	No Access to resources for batch	No Read Access allowed for the resources under this batch id
<SOAP Fault>	Use policy violated with YY* records retrieved. Maximum allowed is 200,000 records	
<SOAP Fault>	Use policy violated with an attachment of size XX* MB. Maximum allowed attachment size is 15 MB	
<SOAP Fault>	MessageHeader version is missing or invalid	MessageHeader version number is required for backwards compatibility: "v20160301"
1021	Invalid Trade Date	Meter data can only be submitted for upto 7 days in the future
1022	Invalid Unit of Measurement	Unit of Measurement is not in values [k,M]
1024	Actual data cannot be provided for this trade date	Actual data can only be submitted once the trade date has occurred
1026	Time Interval length does not match meter data interval specified for this resource	Meter data interval as specified per resource in the master file does not match the time interval length being submitted
1027	Invalid measurement type for resource ID	The measurement type specified for the resource ID is not valid
1028	<u>Meter value of X* MWh exceeds the PMAX of Y* MWh</u>	Meter value submitted for a resource is more than the registered PMAX in the master file. Note: This is a warning, and data will still be accepted
1029	<u>Invalid SC ID or ACL Group</u>	The SC ID or ACL Group being specified is not provisioned to the user
1030	<u>Invalid meter value</u>	Meter value cannot be negative
1031	<u>Invalid Request</u>	Request for "ALL" resources cannot be combined with

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		individual resources in the same MeterDataRequest class
1032	<u>PDR Resource should be AS certified when measure type is LOAD or MBMA</u>	Only PDR resources that are AS certified can submit LOAD or MBMA
<SOAP Fault>	<i>“CAISO MRI-S Acceptable Use Policy Violation. Please retry your request again in 30 seconds from now. Note: Time resets each time you request before expiration.”</i>	Users will receive this response if they submit same retrieve request within 30 seconds of the previous request.

\*actual values

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## 9. UI – CSV File Specification

### 9.1 File Content Rules

1. The required header record will consist of all the Field names identified in *Field Specifications*.
2. The field names are not case sensitive.
3. The file will not use text qualifiers such as single quote or double quote characters.
4. The file will use ANSI characters with CRLF to separate records.
5. Submit all inbound files in GMT format.
6. All file records will be consistent with respect to a single time format

### 9.2 File Name

1. Inbound file extension must be “.CSV”.
2. Filename length must not exceed 255 characters, including the extension.
3. Filename is case insensitive.

### 9.3 Field Specification

All fields shown below are REQUIRED


ORDER	FIELD	TYPE (Max Length)	DESCRIPTION
1	RES_ID	Text (32)	Resource ID as defined in the Master File  Example: ABC1_UNIT 1
2	MSMT_TYPE	Text (4)	Type of Measurement. Valid values are: LOAD or GEN or MBMA or CBL or TMNT* *Meter Before Meter After (MBMA), Baseline Load Data (CBL) and Treatment Group Load Data (TMNT) can only be used upon ESDER 2 project activation for DRS Replacement. Measurement types are the same as channel ID in current metering solution. LOAD is channel 1, GEN is channel 4 and MBMA is channel 9.

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3	INTERVAL_END_TIME	Date Time (29)	End Datetime in GMT of the interval for which the meter value is being submitted. This is interval ending.  Example: 2016-06-04T07:15:00.000+00:00
4	VALUE	Decimal (16,8)	Meter Value. Decimal values should be (14,7), meaning up to 7 digits before and after the decimal point.  Example: 1.1234567
5	UOM	Text (1)	Unit of Measure.  Valid values are k (for kWh) or M (for MWh)
6	INTERVAL_LENGTH	Integer (2)	Interval length in minutes.  Valid values are 5, 15 or 60
7	MSMT_QUALITY	Text (1)	Measurement Quality.  Valid values are A or E.

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## 10. UI – MDEF File Specification

### 10.1 File Structure

Each record of the file has the following basic layout:

BYTES	FIELD	DESCRIPTION
1-2	RLEN	Record Length
3-4	RCODE	Record Code
5-216		Data (format based on RCODE)

The record code (RCODE) is used to define several different types of records. The types of records and data to be included are:

RCODE	DESCRIPTION
1	Meter (Recorder/Site) Record (ID, Start/Stop Times, etc.)
10	Channel Header Records (Recorder ID, Meter Readings, Physical Channel Number, etc.)
1001-9998	Interval Data Records
9999	Trailer Record (One record per file)

### 10.2 Meter (Recorder / Site) Header Record Layout


There will be one meter (recorder / site) header record written for each set of data. The Record Length (RLEN) and Record Code (RCODE) will be binary fields stored in Least Significant Byte (LSB) first. All other fields in the record will be character fields written in ASCII.

FIELD	BYTES	TYPE	DESCRIPTION
RLEN	01-02	Int	Record Length
RCODE	03-04	Int	Record Code (Value = 1)
CM_CUSTID	05-24	A/N	Customer ID (Optional)
CM_NAME	25-44	A/N	Customer Name (Optional)
CM_ADDR1	45-64	A/N	Customer Address Line 1 (Optional)
CM_ADDR2	65-84	A/N	Customer Address Line 2 (Optional)
CM-ACCOUNT	85-104	A/N	Customer Account Number (Optional)
	105-111	A/N	Reserved
CM_LOGCHAN S	112-115	A/N	Total Channels for Customer (Optional)
	116-119	A	Reserved
TA_START	120-131	N	Start Time of data (yyyymmddhhmm) (see Notes below)

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TA_STOP	132-143	N	Stop Time of data (yyyymmddhhmm) (see Notes below)
DSTFLAG	144	A	' ' = Observes Daylight Savings Time, 'N' = Standard Time, 'Y' = Observes Daylight Savings Time (DST) (see Notes below)
	145-216	A/N	Reserved

### 10.2.1 Start and Stop Times

These times represent the start and stop times for an individual meter’s channel data stored after the Meter (Recorder / Site) Header. The interval data for each channel in the file up to the next Meter (Recorder / Site) Header must cover this time period exactly. The last hour of the day is defined as “2400”.

In the case of a Fall DST change, TA\_STOP time cannot fall on the 01:00, 02:00, or any interval between 01:00 or 02:00.

### 10.2.2 DST Flag

The DSTFLAG should always be N since the data needs to be submitted in GMT.

## 10.3 Channel Header Record Layout

There will be one channel header record written for each channel of data to be sent to the mainframe. The Record Length (RLEN), Record Code (RCODE), Logical Channel Number (DC\_LOGCHAN), and the KW/KVAR/KVA Set Number (DC\_KVASET) will be binary fields stored in Least Significant Byte (LSB) first. All other fields in the record will be character fields written in ASCII.


FIELD	BYTES	TYPES	DESCRIPTION
RLEN	01-02	Int	Record Length
RCODE	03-04	Int	Record Code (Value = 10)
DC_CUSTID	05-24	A/N	Customer ID (Optional)
DC_RECID	25-38	A/N	Resource ID (Site ID)
	39-44	A/N	Reserved for Resource ID
DC_METERID	45-56	A/N	Meter Number (Optional)
TA_START	57-68	N	Start Time (YYYYMMDDHHMM) (See Notes below)
TA_STOP	69-80	N	Stop Time (YYYYMMDDHHMM) (See Notes below)
	81-92	A/N	Reserved
	93	A/N	Reserved
DC_PYSCHAN	94-95	N	Meter Channel Number

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DC_LOGCHAN	96-97	Int	Customer Channel Number (Optional)
DC_UMCODE	98-99	N	Unit Of Measure Code (see Table below for definitions)
CHANSTAT	100	A	Channel Status Present (Y/N)
INTSTAT	101	A	Interval Status Present (Y/N)
STRTMTR (Optional)	102-113	N	Start Meter Reading (See Notes below)
STOPMTR (Optional)	114-125	N	Stop Meter Reading (See Notes below)
	126	A/N	Reserved
DC_MMULT	127-136	N	Meter Dial Multiplier (3 dec)
	137-166	A/N	Reserved
DC_SERVTYPE	167	A	'W'=WYE, 'D'=Delta '+'=Lagging P.F., '-'=Leading P.F. (Optional)
	168-177	A/N	Reserved
DR_INPHR	178-179	N	Intervals Per Hour
	180-193	A/N	Reserved
TD_STATUS	194-195	A	Validation Results (Future)
	196-210	A/N	Reserved
DC_FLOW	211	A	Power Flow Direction (Optional) 'D'=Delivered, 'R'=Received
DC_KVASET	212-213	Int	KW/KVAR/KVA Set Number (Optional)
TD_ORIGIN	214	A	Origin of Data (Optional) 'T'=Translated, 'R'=Remote, Interrogation, 'I'=Imported, 'P'=Portable, 'S'=Summary File
	215-216	A/N	Reserved

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### 10.3.1 Start and Stop Times

Start and Stop times in the Channel Headers should match the Start and Stop times in the Meter (Recorder / Site) Header unless the channel data is being split due to an interval size or Unit of Measure (UOM) change. In that case, the Start time in the Channel Header of the first split and the Stop time in the Channel Header of the last split should match the times in the Meter (Recorder / Site) Header. The Start and Stop times in the Channel Headers should always represent the time span of the Interval Data Records immediately following the header. The last hour of the day is defined as “2400”.

In the case of a Fall DST change, TA\_STOP time cannot fall on the 01:00, 02:00, or any interval between 01:00 or 02:00.


### 10.3.2 Start and Stop Meter Readings

These meter readings will be calculated for the start and stop times based upon actual meter readings retrieved during previous meter interrogations. The Unit of Measure (UOM) values are: 01 for KWH or 41 for MWH

## 10.4 Interval Data Record(s) Layout

Interval data records will consist of engineering units data and associated interval and channel status codes.

- a. Each interval data record will contain up to 48 elements (intervals) of data in the four byte IEEE floating point format. The actual number of intervals per data record will depend on the presence of channel and/or interval status data. The status data will be output as two byte unsigned integers for both the channel and interval status.
- b. If the last data record for each channel is not completely filled with data, it will be padded to the end of the record with a binary integer value of 32767 for each two bytes of the four byte interval value and in each two bytes of the status codes (if status codes are present).
- c. Any gaps in data will be resolved by padding the time period of the gap with zero data and setting the interval status to missing data. All channel data records will have data (or values identified as missing) for the time period shown in the Channel Header record.
- d. If there are changes in interval length or Unit of Measure (UOM) codes for a channel, the data will be split with a channel header record preceding each part of the channel data. When a channel is split, then all channels for the device should be split at the same interval.
- e. All binary data including the two byte record length, two byte record code, two byte customer channel number, four byte IEEE floating point interval values, the two byte interval and channel status data, and the two byte 32767 end of record padding values are all stored with the Least Significant Byte (LSB) first.

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This table defines the interval data record layout.

<b>FIELD</b>	<b>BYTES</b>	<b>TYPE</b>	<b>DESCRIPTION</b>
RLEN	01-02	Int	Record Length
RCODE	03-04	Int	Record Code(Value=100 1-9998)
CM_CUSTID	05-24	A/N	Customer ID (Optional)
INTERVAL	25-26	Float	Interval Data in Engineering Units (192 bytes)
			48 Intervals-No Status Active
			32 Intervals-One Status Active
			24 Intervals-Both Status Active

## 10.5 Trailer Record Layout

The trailer record will be the last record written in a data set and will contain the total number of customers in the file as well as the total records written to the file.

<b>FIELD</b>	<b>BYTES</b>	<b>TYPES</b>	<b>DESCRIPTION</b>
RLEN	01-02	Int	Record Length
RCODE	03-04	Int	Record Code (Value=9999)
	05-34	A/N	Reserved
TOTREC	35-44	N	Total Record Count (includes Trailer)
	45-204	A	Reserved
XF_TSTAM P	205-216	N	Time Stamp (yyyymmddhhss) (Optional) (see Notes below)