



SPP API DATA EXCHANGE GUIDE

FOR BEHIND-THE-METER AND DEMAND
RESPONSE DATA SUBMISSION

By: Joe Codemo

Published on: 07/10/2023

Version 1.1

REVISION HISTORY

DATE/VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
06/22/2023 V1.0	Joe Codemo	Initial document
07/10/2023 V1.1	Joe Codemo	Updated information about Registration Process to remove bad link and include link to UAA documentation.

CONTENTS

- Revision History 2
- Contents 3
- Executive Summary 4
- Web Service Overview 4
- Deployment Environment 4
 - Client Side 5
- SOAP MESSAGES 5
 - Format and Construction 5
 - Data Types 6
 - Decimal Values 6
 - Responses 6
- Registration Process 7
- Methods 7
 - ConnectionCheck 7
 - AuthCheck 8
 - PostBTMMonthly 8
 - PostDRMonthly 9
 - PostBTMWeekly 10
 - PostDRWeekly 10
- XML Examples 11

EXECUTIVE SUMMARY

This document describes the SOAP messages used to retrieve and submit data from the SPP CROW Outage Scheduler API. This document describes the background for each message and lays out the format and construction of SOAP messages.

This document is an aid for SPP members and participating vendors in developing interfaces to access the SPP CROW API (Outage Management System) data packages.

Users of this guide should be familiar with SOAP, Extensible Markup Language (XML), Web Services and HTTP/HTTPS protocols.

WEB SERVICE OVERVIEW

The SPP BTMDR API (Behind the Meter/Demand Response) web services will use SOAP over HTTPS and have operations and message content defined using Web Services Definition Language (WSDL).

The web service addresses are as follows:

Test

<https://api-mte.itespp.org/services/BTMDRDataConsumingService/v1?wsdl>

Prod (upon launch)

<https://api.spp.org/services/BTMDRDataConsumingService/v1?wsdl>

Within this document, all web service operations have been described using a request/reply pattern that is typical of HTTPS communication. A request must contain a message that queries or submits data. A reply contains a message that is either: 1) an error, or 2) the response to the action taken. It is required that all data be transported using digital certificates.

DEPLOYMENT ENVIRONMENT

From an HTTPS point of view, client software initiates a request, while server software responds to a client request.

Client-side software is used under the following scenarios:

- A data-consuming application requests data from a data owning application (sends an HTTPS GET)

Server-side software is used under the following scenarios:

- A data-owning application receives a request for data from a data consuming application (responds to an HTTPS GET)

Client Side

The client software needs to:

- Have the ability to use X.509 digital certificates (Required)
- Rely on configuration to obtain endpoints and certificate locations (Suggested)
- Rely on configuration to specify the maximum number of retries for sending requests to endpoints (Suggested)

SOAP MESSAGES

This section describes the documentation conventions used and the constructs of SOAP messages.

Format and Construction

SOAP messages are an XML-formatted structure wrapped in a SOAP envelope. A sample instance of an XML document with a SOAP envelope is shown below:

```
<soapenv:Envelope>
  xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:mes="http://someurl/Messages">
  <soapenv:Header/>
  <soapenv:Body>
    <mes:SubmitSomeMessage>
      <!--1 or more repetitions:-->
      <mes:Message day="2010-06-01" ID="1234">
        <mes:HourlyData>
          <!--Up to 25 repetitions:-->
          <mes:Values hour="2010-06-01T00:00:00-06:00">
            <mes:Value1>SomeValue</mes:Value1>
            <mes:Value2>AnotherValue</mes:Value2>
          </mes:Values>
        </mes:HourlyData >
      </mes:Message>
    </mes:SubmitSomeMessage>
  </soapenv:Body>
</soapenv:Envelope>
```

The sample message above shows the format of messages used in the descriptions for each interface.

Data Types

Within the XSD, both native XML data types and custom-defined data types are used. Below is a list of the common data types used with a description of their format. See the SPP BTMDR API (Behind the Meter/Demand Response) Reference guide that defines the types used by these services.

StartTime/EndTime Values

The StartTime and EndTime values represent the starting Market Hour and ending Market Hour for the measurements. These values are GMT and are specified by the ISO 8601 standard. There should not be any minutes or seconds specified as these represent hourly values only.

The EndTime is not included in the interval. For example, if the first interval has a StartTime = '2023-05-15T06:00:00Z' and EndTime of '2023-05-15T12:00:00Z', the next interval should have a StartTime of '2023-05-15T12:00:00Z'.

Data Type	Lexical Representation	Example
dateTime	yyyy-mm-ddThh:00:00Z	2023-06-01T05:00:00Z

Decimal Values

The various megawatt (MW) values are represented as Decimal(12,5). This means the number is at most 12 digits long, with 5 digits after the decimal point. This is validated by the XML Schema.

These are valid values:

- 123.45
- 0.98
- 1234567.12345
- 12

Responses

A query will return either the Standard Error Response as shown below or a response message that is specific to the query. If an empty body is returned, either there is no data to return based on your query parameters or there is a server side error that has not been captured for formatting as of this document's writing.

Standard Query Response

```
<soapenv:Envelope>
  xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  <soapenv:Header/>
  <soapenv:Body>
    <!--Zero or more repetitions:-->
```

```

    <mes:Data xmlns:mes="http://api.spp.com/general_service">
      <mes:Row?</mes:Row>
    </mes:Data>
  </soapenv:Body>
</soapenv:Envelope>

```

Standard Error Response

```

<soapenv:Envelope>
  xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  <soapenv:Header/>
  <soapenv:Body>
    <soapenv:Fault>
      <!--One or more repetitions:-->
      <faultcode?</faultcode>
      <faultstring?</faultstring>
    </soapenv:Fault>
  </soapenv:Body>
</soapenv:Envelope>

```

REGISTRATION PROCESS

The user's digital certificate will need to be granted access to the "BTM-DR Data Service" application in Portal and granted the proper roles:

- PostBTMData – allows the user to post Behind the Meter data, both Monthly and Weekly
- PostDRData – allows the user to post Demand Response data, both Monthly and Weekly.

For more information, see the Portal Application Role Reference Guide located here:

<https://uaa.spp.org/lisa/documentation> (PROD) or

<https://uaa-mte.itespp.org/lisa/documentation> (MTE)

METHODS

ConnectionCheck	
Method Name:	ConnectionCheck
Description:	This method allows clients to verify they are able to connect to SPP webservices. There is no authentication for this method; it is simply a query/response service.
Message Confirmation	

	<p>Returns: MessageConfirmation</p> <p>If the connection check was successful, the client will receive a MessageConfirmation object with a Status of "Success." If unsuccessful, the client will receive an error message.</p>
--	--

AuthCheck			
Method Name:	AuthCheck		
Description:	This method allows clients to validate that they can be authenticated and are authorized to execute the methods.		
Input Parameters:			
<u>Parameter Name</u>	<u>Requirement</u>	<u>Parameter Type</u>	<u>Description</u>
AuthCheck	Required	String	Either "PostBTMData" or "PostDRData," depending on the client's permissions set by their LSA.
Message Confirmation			
<p>Returns: MessageConfirmation</p> <p>If the authorization check was successful, the client will receive a MessageConfirmation object with a Status of "Success." If unsuccessful, the client will receive a SOAP Fault stating that the client is not authorized for the operation specified.</p>			

PostBTMMonthly			
Method Name:	PostBTMMonthly		
Description:	The monthly Behind the Meter data. There should be records covering all hours for the month. For example, for May there should be records from the first of the month (for CPT, that would be 2023-05-01T06:00:00Z) with a final EndTime of 2023-06-01T06:00:00Z.		
Input Parameters:			
<u>Parameter Name</u>	<u>Requirement</u>	<u>Parameter Type</u>	<u>Description</u>
Sender	Required	String, up to 100 characters	Name of entity submitting this data.
StartTime	Required	DateTime	Start time of interval, in GMT. Format is YYYY-MM-DDTHH:00:00Z
EndTime	Required	DateTime	Start time of interval, in GMT. Format is

			YYYY-MM-DDTHH:00:00Z
Resource	Required	String, up to 100 characters	Name of the resource.
TotalAvailCapacity	Required	Decimal(12,5)	Total available capacity in MW.
OutputLimited	Required	"Y" or "N"	Is the output limited to actual load at discrete POD?
Comment	Optional	String, up to 1000 characters	An optional comment.

Message Confirmation

Returns: MessageConfirmation

If the method call was successful, the client will receive a MessageConfirmation object with a Status of "Success." If unsuccessful, the client will receive an error message.

PostDRMonthly

Method Name: PostDRMonthly

Description: Monthly Demand Response data

Input Parameters:

<u>Parameter Name</u>	<u>Requirement</u>	<u>Parameter Type</u>	<u>Description</u>
Sender	Required	String, up to 100 characters	Name of entity submitting this data.
StartTime	Required	DateTime	Start time of interval, in GMT. Format is YYYY-MM-DDTHH:00:00Z
EndTime	Required	DateTime	Start time of interval, in GMT. Format is YYYY-MM-DDTHH:00:00Z
Program	Required	String, up to 100 characters	Name of the load reduction program.
TotalAvailReduction	Required	Decimal(12,5)	Total available load reduction, in MW.
Comment	Optional	String, up to 1000 characters	An optional comment

Message Confirmation

Returns: MessageConfirmation

If the method call was successful, the client will receive a MessageConfirmation object with a Status of "Success." If unsuccessful, the client will receive an error message.

PostBTMWeekly			
Method Name:	PostBTMWeekly		
Description:	Weekly Behind-the-Meter data		
Input Parameters:			
<u>Parameter Name</u>	<u>Requirement</u>	<u>Parameter Type</u>	<u>Description</u>
Sender	Required	String, up to 100 characters	Name of entity submitting this data
StartTime	Required	DateTime	Start time of interval, in GMT. Format is YYYY-MM-DDTHH:00:00Z
EndTime	Required	DateTime	Start time of interval, in GMT. Format is YYYY-MM-DDTHH:00:00Z
Resource	Required	String, up to 100 characters	Name of the resource
AvailCapacity	Required	Decimal(12,5)	Planned unutilized available capacity, in MW
RemainingEnergy	Required	Decimal(12,5)	Remaining energy, in MW
MaxDailyEnergy	Required	Decimal(12,5)	MaxDailyEnergy, in MW
StartupTimeMinutes	Required	Integer	Startup time, in minutes
Comment	Optional	String, up to 1000 characters	An optional comment
Message Confirmation			
Returns: MessageConfirmation			
If the method call was successful, the client will receive a MessageConfirmation object with a Status of "Success." If unsuccessful, the client will receive an error message.			

PostDRWeekly			
Method Name:	PostDRWeekly		
Description:	Weekly Demand Response data.		
Input Parameters:			
<u>Parameter Name</u>	<u>Requirement</u>	<u>Parameter Type</u>	<u>Description</u>
Sender	Required	String, up to 100 characters	Name of entity submitting this data
StartTime	Required	DateTime	Start time of interval, in GMT. Format is YYYY-MM-DDTHH:00:00Z

EndTime	Required	DateTime	Start time of interval, in GMT. Format is YYYY-MM-DDTHH:00:00Z
Program	Required	String, up to 100 characters	Name of the load reduction program
AvailReduction	Required	Decimal(12,5)	Planned unutilized available load reduction, in MW
RemainingReduction	Required	Decimal(12,5)	Remaining load reduction, in MW
MaxDailyReduction	Required	Decimal(12,5)	Max daily reduction, in MW
DeployTimeMinutes	Required	Integer	Deployment time, in minutes
Comment	Optional	String, up to 1000 characters	An optional comment
Message Confirmation			
Returns: MessageConfirmation			
If the method call was successful, the client will receive a MessageConfirmation object with a Status of "Success." If unsuccessful, the client will receive an error message.			

XML EXAMPLES

The following XML examples are scaled down XML requests used to submit for each web method.

Web Method – ConnectionCheck

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:v1="http://api.spp.org/services/BTMDR/BTMDRData/v1">
  <soapenv:Header/>
  <soapenv:Body>
    <v1:ConnectionCheck/>
  </soapenv:Body>
</soapenv:Envelope>
```

Success –

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <MessageConfirmation xmlns="http://api.spp.org/schema/market/Common/v1">
      <Status>Success</Status>
      <Description>Connection was successful.</Description>
    </MessageConfirmation>
  </soap:Body>
</soap:Envelope>
```

Web Method – AuthCheck

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:v1="http://api.spp.org/services/BTMDR/BTMDRData/v1">
  <soapenv:Header/>
  <soapenv:Body>
    <v1:AuthCheck>PostBTMData</v1:AuthCheck>
  </soapenv:Body>
</soapenv:Envelope>
```

Success –

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <MessageConfirmation xmlns="http://api.spp.org/schema/market/Common/v1">
      <Status>Success</Status>
      <Description>User is authorized to use this service.</Description>
    </MessageConfirmation>
  </soap:Body>
</soap:Envelope>
```

Failure –

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <soap:Fault>
      <faultcode>soap:Client</faultcode>
      <faultstring>Unauthorized: [79a22b92-3fce-4426-8e89-600634eae2ed], User
[XXXXXXXXXX7095397644724CE3C600010000XXXX|CN=sppcorp-DCCCERTBV-
CA,DC=sppcorp,DC=org] is not authorized for operation [PostDRData].</faultstring>
    </soap:Fault>
  </soap:Body>
</soap:Envelope>
```

Web Method – PostBTMMonthly

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:v1="http://api.spp.org/services/BTMDR/BTMDRData/v1">
  <soapenv:Header/>
  <soapenv:Body>
    <v1:PostBTMMonthly>
      <v1:BTMMonthlyEntry>
        <v1:Sender>Company 1</v1:Sender>
        <v1:StartTime>2023-03-01T06:00:00Z</v1:StartTime>
        <v1:EndTime>2023-04-01T05:00:00Z</v1:EndTime>
      </v1:BTMMonthlyEntry>
    </v1:PostBTMMonthly>
  </soapenv:Body>
</soapenv:Envelope>
```

```

    <v1:Resource>Trenton North 1 </v1:Resource>
    <v1:TotalAvailCapacity>2.6</v1:TotalAvailCapacity>
    <v1:OutputLimited>Y</v1:OutputLimited>
  </v1:BTMMonthlyEntry>
</v1:PostBTMMonthly>
</soapenv:Body>
</soapenv:Envelope>

```

Success –

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <MessageConfirmation xmlns="http://api.spp.org/schema/market/Common/v1">
      <Status>Success</Status>
      <Description>Data was successfully received and processed.</Description>
    </MessageConfirmation>
  </soap:Body>
</soap:Envelope>

```

Web Method – PostBTMWeekly

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:v1="http://api.spp.org/services/BTMDR/BTMDRData/v1">
  <soapenv:Header/>
  <soapenv:Body>
    <v1:PostBTMWeekly>
      <v1:BTMWeeklyEntry>
        <v1:Sender>Company 1</v1:Sender>
        <v1:StartTime>2023-05-15T05:00:00Z</v1:StartTime>
        <v1:EndTime>2023-05-22T05:00:00Z</v1:EndTime>
        <v1:ResourceName>Generator 1</v1:ResourceName>
        <v1:AvailCapacity>2.5</v1:AvailCapacity>
        <v1:RemainingEnergy>12</v1:RemainingEnergy>
        <v1:MaxDailyEnergy>15</v1:MaxDailyEnergy>
        <v1:StartupTimeMinutes>20</v1:StartupTimeMinutes>
        <v1:Comment/>
      </v1:BTMWeeklyEntry>
    </v1:PostBTMWeekly>
  </soapenv:Body>
</soapenv:Envelope>

```

Success –

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <MessageConfirmation xmlns="http://api.spp.org/schema/market/Common/v1">

```

```

    <Status>Success</Status>
    <Description>Data was successfully received and processed.</Description>
  </MessageConfirmation>
</soap:Body>
</soap:Envelope>

```

Web Method – PostDRMonthly

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:v1="http://api.spp.org/services/BTMDR/BTMDRData/v1">
  <soapenv:Header/>
  <soapenv:Body>
    <v1:PostDRMonthly>
      <v1:DRMonthlyEntry>
        <v1:Sender>Company 1</v1:Sender>
        <v1:StartTime>2023-06-01T05:00:00Z</v1:StartTime>
        <v1:EndTime>2023-07-01T05:00:00Z</v1:EndTime>
        <v1:Program>Load Reduction Program 1</v1:Program>
        <v1:TotalAvailReduction>1.5</v1:TotalAvailReduction>
        <v1:Comment/>
      </v1:DRMonthlyEntry>
    </v1:PostDRMonthly>
  </soapenv:Body>
</soapenv:Envelope>

```

Success –

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <MessageConfirmation xmlns="http://api.spp.org/schema/market/Common/v1">
      <Status>Success</Status>
      <Description>Data was successfully received and processed.</Description>
    </MessageConfirmation>
  </soap:Body>
</soap:Envelope>

```

Web Method – PostDRWeekly

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:v1="http://api.spp.org/services/BTMDR/BTMDRData/v1">
  <soapenv:Header/>
  <soapenv:Body>
    <v1:PostDRWeekly>
      <v1:DRWeeklyEntry>
        <v1:Sender>Company 1</v1:Sender>
        <v1:StartTime>2023-05-15T05:00:00Z</v1:StartTime>

```

```
<v1:EndTime>2023-05-22T05:00:00Z</v1:EndTime>
<v1:Program>Load Reduction Program 1</v1:Program>
<v1:AvailReduction>1.25</v1:AvailReduction>
<v1:RemainingReduction>2.1</v1:RemainingReduction>
<v1:MaxDailyReduction>3.14</v1:MaxDailyReduction>
<v1:DeployTimeMinutes>25</v1:DeployTimeMinutes>
<v1:Comment>Test comment</v1:Comment>
</v1:DRWeeklyEntry>
</v1:PostDRWeekly>
</soapenv:Body>
</soapenv:Envelope>
```

Success –

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <MessageConfirmation xmlns="http://api.spp.org/schema/market/Common/v1">
      <Status>Success</Status>
      <Description>Data was successfully received and processed.</Description>
    </MessageConfirmation>
  </soap:Body>
</soap:Envelope>
```