



MxVision WeatherSentry[®]
Web Services

SOAP Programming Guide

DTN
11400 Rupp Drive
Minneapolis, MN 55337
00.1.952.890.0609



© Copyright 2012 DTN. All rights reserved.

This document and the software it describes are copyrighted with all rights reserved. Neither this document nor the software may be copied in whole or in part without the prior written consent of the copyright owner. Printed in the United States of America.

DTN is a registered trademark and the property of DTN. All rights reserved.

All other trademarks are the properties of their respective owners.



Table of Contents

Table of Contents	3
Introduction.....	4
1.1 Terminology	4
1.2 References	4
1.3 Release Management	5
Requests	6
1.4 Web Services Description Language (WSDL).....	6
1.5 SOAP Envelope	6
1.5.1 WeatherDataRequest Required Parameters.....	7
1.6 Example - request by StationID.....	8
1.7 Example - request by postalAddress.....	9
1.8 Example - request by Latitude/Longitude	10
Security	11
1.9 OASIS Web Services Security (WSSe).....	11
Optional Parameters.....	12
1.10 locationRequest	12
1.10.1 elementRequestList.....	12



Introduction

MxVision WeatherSentry® Web Services from DTN provides your organization with the highly accurate weather observations and forecasts relied on worldwide to protect people, resources and profitability. These forecasts are top ranked by the independent agency ForecastWatch.com as the most accurate among industry providers.

These web services permit the retrieval of data using one of two standards: REST or SOAP.

This document is intended for those who wish to implement a SOAP client. If you prefer to use a REST-ful client, refer to <http://weather.telventdn.com/rest/>.

1.1 Terminology

Client An HTTP client capable of making SOAP-authenticated requests.

Server An HTTP server capable of accepting SOAP-authenticated requests.

Protected Resource An access-restricted resource that can be obtained from the server using an SOAP-authenticated request.

Credentials Credentials are a pair of a unique identifier and a matching shared secret.

1.2 References

SOAP <http://www.w3.org/TR/soap>

WS-Security <http://www.oasis-open.org/standards#wssv1.1>

OASIS Web Services Security <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0.pdf>



1.3 Release Management

The most recent documentation can be found at <http://weather.telventdn.com/soap>

The current software release is available at <http://weather.telventdn.com/soap-V2/>

As features and enhancements are added, new revisions will become available. We will release revisions in two categories, major and minor. Major revisions are not guaranteed to be compatible, while minor revisions will be compatible within their major revision.

Major revisions can be followed automatically by using <http://weather.telventdn.com/soap-V{X}> where {X} is the major revision number. (e.g. <http://weather.telventdn.com/soap-V2>)

Minor revisions may be referenced by using <http://weather.telventdn.com/soap-{X}.{Y}> where {X} is the major revision number and {Y} is the minor revision number. (e.g. <http://weather.telventdn.com/soap-2.1>)

Only the two latest major revisions are supported at any given time. Therefore, when a major revision is released, the link to the oldest major revision will be removed and no longer supported.

For example: Version 1.x and 2.x currently exist. With the release of version 3.0 all links to version 1.x will be removed and no longer supported.



Requests

Requests can be submitted directly via an http POST operation or through use of the WSDL.

1.4 Web Services Description Language (WSDL)

The WSDL is available at <http://weather.telventdtn.com/soap-V2/services/TDTNWeatherDataService?wsdl> and conforms to the WSDL v1.1 standard.

1.5 SOAP Envelope

URL for posting requests is

<http://weather.telventdtn.com/soap-V2/services/TDTNWeatherDataService>

The request header must contain valid Security information in the SOAP Header. ([See the OASIS Web Services Security \(WSSe\) Section of this document.](#))

The request body must contain the following (See: <http://weather.telventdtn.com/soap-V2/doc/TDTNWeatherDataService.xsd>):

- 1) weatherDataRequest
 - a) dataType
 - b) dataTypeMode
 - c) startDate
 - d) endDate
 - i) stationID OR (latitude + longitude)
 - ii) locationRequestList
 - (1) locationRequest
 - (2) locationRequest
 - (3) ...



1.5.1 WeatherDataRequest Required Parameters

Refer to the [XML Schema Definition](#) for dataType options and dataTypeMode options.

NOTE: You must be pre-authorized for the combination of these values in order to use them.



1.6 Example - request by StationID

```
<?xml version='1.0' encoding='UTF-8' standalone='no'?>
<env:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.w3.org/2003/05/soap-
envelope" xmlns:env="http://www.w3.org/2003/05/soap-envelope" xsi:schemaLocation="http://www.w3.org/2003/05/soap-
envelope http://weather.telventdn.com/soap-V2/doc/soap-envelope.xsd">
  <env:Header>
    <wsse:Security xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
env:mustUnderstand="1">
      <wsse:UsernameToken xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-
1.0.xsd" wsu:Id="UsernameToken-9">
        <wsse:Username>SomeTestUser</wsse:Username>
        <wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-
1.0#PasswordDigest">dgcs9JzrMHc6aiu0clfoizFPr7w=</wsse:Password>
        <wsse:Nonce EncodingType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-
1.0#Base64Binary">MHgxLjdiMmMyMWI3NWQ2N2NwLTI=</wsse:Nonce>
        <wsu:Created>2012-03-20T11:57:38Z</wsu:Created>
      </wsse:UsernameToken>
    </wsse:Security>
  </env:Header>
  <env:Body>
    <wx:weatherDataRequest xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wx="http://weather.telventdn.com/soap-V2/doc/" xmlns="http://weather.telventdn.com/soap-V2/doc/"
xsi:schemaLocation="http://weather.telventdn.com/soap-V2/doc/ http://weather.telventdn.com/soap-
V2/doc/TDTNWeatherDataService.xsd">
      <wx:dataType>DailyForecast</wx:dataType>
      <wx:dataTypeMode>0001</wx:dataTypeMode>
      <wx:startDate>2012-03-19T15:02:03Z</wx:startDate>
      <wx:endDate>2012-03-22T15:02:03.004000Z</wx:endDate>
      <wx:locationRequestList>
        <wx:locationRequest>
          <wx:stationID>KMSP</wx:stationID>
        </wx:locationRequest>
      </wx:locationRequestList>
    </wx:weatherDataRequest>
  </env:Body>
</env:Envelope>
```




1.7 Example - request by postalAddress

```
<?xml version='1.0' encoding='UTF-8' standalone='no'?>
<env:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.w3.org/2003/05/soap-
envelope" xmlns:env="http://www.w3.org/2003/05/soap-envelope" xsi:schemaLocation="http://www.w3.org/2003/05/soap-
envelope http://weather.telventdn.com/soap-V2/doc/soap-envelope.xsd">
  <env:Header>
    <wsse:Security xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
env:mustUnderstand="1">
      <wsse:UsernameToken xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-
1.0.xsd" wsu:Id="UsernameToken-9">
        <wsse:Username>SomeTestUser</wsse:Username>
        <wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-
1.0#PasswordDigest">dgcs9JzrMHc6aiu0clfoizFPr7w=</wsse:Password>
        <wsse:Nonce EncodingType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-
1.0#Base64Binary">MHgxLjdiMmMyMWI3NWQ2N2NwLTI=</wsse:Nonce>
        <wsu:Created>2012-03-20T11:57:38Z</wsu:Created>
      </wsse:UsernameToken>
    </wsse:Security>
  </env:Header>
  <env:Body>
    <wx:weatherDataRequest xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wx="http://weather.telventdn.com/soap-V2/doc/" xmlns="http://weather.telventdn.com/soap-V2/doc/"
xsi:schemaLocation="http://weather.telventdn.com/soap-V2/doc/ http://weather.telventdn.com/soap-
V2/doc/TDTNWeatherDataService.xsd">
      <wx:dataType>DailyForecast</wx:dataType>
      <wx:dataTypeMode>0001</wx:dataTypeMode>
      <wx:startDate>2012-03-19T15:02:03Z</wx:startDate>
      <wx:endDate>2012-03-22T15:02:03.004000Z</wx:endDate>
      <wx:locationRequestList>
        <wx:locationRequest>
          <wx:postalAddress>11400 Rupp Dr, Burnsville, MN 55337-1279</wx:postalAddress>
        </wx:locationRequest>
      </wx:locationRequestList>
    </wx:weatherDataRequest>
  </env:Body>
</env:Envelope>
```



1.8 Example - request by Latitude/Longitude

```
<?xml version='1.0' encoding='UTF-8' standalone='no'?>
<env:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.w3.org/2003/05/soap-
envelope" xmlns:env="http://www.w3.org/2003/05/soap-envelope" xsi:schemaLocation="http://www.w3.org/2003/05/soap-
envelope http://weather.telventdn.com/soap-V2/doc/soap-envelope.xsd">
  <env:Header>
    <wsse:Security xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
env:mustUnderstand="1">
      <wsse:UsernameToken xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-
1.0.xsd" wsu:Id="UsernameToken-9">
        <wsse:Username>SomeTestUser</wsse:Username>
        <wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-
1.0#PasswordDigest">dgcs9JzrMHc6aiu0clfoizFPr7w=</wsse:Password>
        <wsse:Nonce EncodingType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-
1.0#Base64Binary">MHGxLjdiMmMyMWI3NWQ2N2NwLTl=</wsse:Nonce>
        <wsu:Created>2012-03-20T11:57:38Z</wsu:Created>
      </wsse:UsernameToken>
    </wsse:Security>
  </env:Header>
  <env:Body>
    <wx:weatherDataRequest xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wx="http://weather.telventdn.com/soap-V2/doc/" xmlns="http://weather.telventdn.com/soap-V2/doc/"
xsi:schemaLocation="http://weather.telventdn.com/soap-V2/doc/ http://weather.telventdn.com/soap-
V2/doc/TDTNWeatherDataService.xsd">
      <wx:dataType>DailyForecast</wx:dataType>
      <wx:dataTypeMode>0001</wx:dataTypeMode>
      <wx:startDate>2012-03-19T15:02:03Z</wx:startDate>
      <wx:endDate>2012-03-22T15:02:03.004000Z</wx:endDate>
      <wx:locationRequestList>
        <wx:locationRequest>
          <wx:latitude>24.555893</wx:latitude>
          <wx:longitude>-81.759464</wx:longitude>
        </wx:locationRequest>
      </wx:locationRequestList>
    </wx:weatherDataRequest>
  </env:Body>
</env:Envelope>
```



Security

Authentication of requests is handled through usage of the Web Services Security (WSSe) Standard from the OASIS group.

1.9 OASIS Web Services Security (WSSe)

The OASIS Web Services Security model is the standard used for securing access to the SOAP web services. The OASIS document “Web Services Security Username Token Profile 1.0” describes the portion of the standard most relevant to the weather services implementation; that document can be found at <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0.pdf> .

This security model is based on a shared user name and password, with a scheme for encrypting the password. It requires that each request include the <wsse:UsernameToken> element – consisting of four parameters:

- *Username*: Clear text user name
- *Nonce*: Randomly generated numeric value. This string must be unique for each request.
- *Created*: When the <wsse:UsernameToken> was created. This value must be within 1-hour of UTC and expressed at the zero meridian (Zulu). See also the [xsd:dateTime definition from the W3C](#).
- *Password*: Encrypted password digest. This value is unique per request and is built by combining (unencoded) Nonce + Created + userPassword (which is the shared key). Once combined into a single string, the result needs to be hashed with SHA1 and then encoded as Base64. This final, encrypted value will be inserted here.

Below is an example of the security component of the request using the UsernameToken with a Digest password:

```
<wsse:Security xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-  
wssecurity-secext-1.0.xsd">  
<wsse:UsernameToken xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-  
wssecurity-utility-1.0.xsd">  
  <wsse:Username>SomeUser</wsse:Username>
```



```
<wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#PasswordDigest">yVZmbCvf+aHF2pHYvi7DkFjhWyU=</wsse:Password>  
<wsse:Nonce>OTItZGdkamIrMWhkaGgzdDhkZ3Z5ZGdkZGg0MzlwaXVyZW02  
</wsse:Nonce>  
<wsu:Created>2011-07-06T17:00:00Z</wsu:Created>  
</wsse:UsernameToken>  
</wsse:Security>
```

Optional Parameters

1.10 LocationRequest

timeOffset: A decimal that will offset the data for the location by the number of hours requested. This allows for all data to be in the same timezone despite the station's true location. By default, if the element is not included in the request the value will be 0 (which is the Zulu timezone).

localTime: An int that will use the station's local time offset when the value is 1, or use the default when the value is 0 or the element is not included in the request.

daylightSavings: An int that flag the data to be presented in daylight savings when the location should observe daylight savings time. This is defaulted to 0 when the element is not included in the request (Standard Time). A value of 1 represents observe daylight savings when the station observes it in the station localtime, a Value of 2 indicates to observe daylight savings when the station observes it in the station localtime, however also should provide 23 or 25 hours in the days value for dates where the time change occurs.

1.10.1 elementRequestList

By default, all elements available for a particular dataType will be returned in the response. Should the request only require a subset of the data elements, or require the units to be in an alternate unit of measure, the elements must be defined within the elementRequestList.

Daily Fields:
stationID
validDateTime
maximumTemperature
minimumTemperature
averageTemperature



averageDewPoint
averageRelativeHumidity
avgHeatIndex
averageWindChill
maxFeelsLikeTemperature
minFeelsLikeTemperature
avgHourlyFeelsLikeTemperaure
peakWindSpeed
averageWSPD
avgWetBulbTemp
minutesOfSunshine
probabiltyOfPrecipitation
precipitation
snowfall
weatherCode
wMOWeatherCode
weatherBankWeatherCode
avgBarometricPressure
evapotranspiration
heatingDegreeDay
coolingDegreeDay
growingDegreeDay
effectiveDegreeDay
percentSun
normalMaximumTemperature
normalMinimumTemperature
normalAverageTemperature
departureFromNormalAverageTemperature
normalHeatingDegreeDay
normalCoolingDegreeDay
normalEffectiveDegreeDay
departureFromNormalHeatingDegreeDay
departureFromNormalCoolingDegreeDay
departureFromNormalEffectiveDegreeDay

Hourly Fields:

cloudCoverPercentage
country
dewPoint
feelsLike
heatIndex
minutesOfSunshine
placeName



precipitationAmount
probabilityOfPrecipitation
relativeHumidity
seaLevelPressure
snowfall
solarRadiation
sunrise
sunset
temperature
visibility
weatherDescription
wetBulbTemperature
windChill
windDirection
windGust
windSpeed