Data Standard Specification

Draft v0.1

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Executive summary

WeatherML (Weather Mark-up Language) will be XML-based and consist initially of a single document type definition (DTD), which can be used for the description of a weather derivatives trade. In this document all the defined fields and entries (called elements in XML) will be explained, and an example trade will be expressed in XML applying the DTD.

The structure of a WeatherML document allows the user to include one or more trades. A trade can be described with a unique identifier (TRADE_ID) and some other essential information needed for processing. The trade details will then be specified in the trade component. Several trade components can exist in a trade. This allows the trader to combine financial instruments in a single trade, for example, a straddle consisting of two options.
Structure of WeatherML

WeatherML (Weather Mark-up Language) will be a standard protocol for weather derivatives deal description data. Its top level is called a document, which can contain one or more trades. Currently, a WeatherML document can only contain trades, but this will be extended to include weather data and other information.

A trade consists of some essential information and the trade details are further described in a trade component (TRADE_COMP). For maximum flexibility, a trade can have one or more components. This allows the trader, or trading system, to put together structured trades, for example, a straddle consisting of two options.

The following fragment demonstrates the structure of a WeatherML document.

```xml
<?xml version="1.0"?>
<Document>
  <Trade>
    <TRADE_ID> 1000055 </TRADE_ID>
    <VERSION> 1 </VERSION>
    <CREATION_DATETIME> 14-Jul-2000 17:13:21 </CREATION_DATETIME>
    ...
    <TradeComp>
      <COMPONENT_ID> 01 </COMPONENT_ID>
      <BUYSELL> SELL </BUYSELL>
      ...
    </TradeComp>
  </Trade>
</Document>
```

Top-level elements

Below is a detailed description of all the fields in the WeatherML DTD. The full version of the DTD is printed in the appendix.

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WeatherML:Document</td>
<td>this is the top-level entry point in WeatherML, which can contain one or more trades</td>
</tr>
<tr>
<td>WeatherML:Trade</td>
<td>this is the element in WeatherML which contains the description of a weather derivative trade - repeatable, so a document can contain more than one trade</td>
</tr>
</tbody>
</table>

Elements in trade

In an element WeatherML:Trade the following child-elements can be specified

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WeatherML:TRADE_ID</td>
<td>a unique identifier for the trade (the ticket)</td>
</tr>
<tr>
<td>WeatherML:VERSION</td>
<td>the WeatherML version number, which will be needed once more than one version of WeatherML is available</td>
</tr>
<tr>
<td>WeatherML:ACTION_FLAG</td>
<td>describes the trade status, used to specify the</td>
</tr>
</tbody>
</table>
necessary action to be taken, for example, waiting or approved

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WeatherML:CREATION_DATETIME</td>
<td>the trade date and time</td>
</tr>
<tr>
<td>WeatherML:POSITION_TAKER</td>
<td>the trader’s name or identifying code</td>
</tr>
<tr>
<td>WeatherML:INPUT_BY</td>
<td>the operator’s name or identifying code</td>
</tr>
<tr>
<td>WeatherML:CP_SHORT</td>
<td>a unique identifier of the counterparty</td>
</tr>
<tr>
<td>WeatherML:CP_LONG</td>
<td>the counterparty’s full name</td>
</tr>
<tr>
<td>WeatherML:CP_LOC</td>
<td>the counterparty’s address</td>
</tr>
<tr>
<td>WeatherML:BROKER</td>
<td>the broker’s name or identifying code</td>
</tr>
<tr>
<td>WeatherML:SETTLEMENT_INSTRUCT</td>
<td>instruction details for the back office</td>
</tr>
<tr>
<td>WeatherML:CREATION_TYPE</td>
<td>origin of trade: manual input or electronic</td>
</tr>
<tr>
<td>WeatherML:LAST_INPUT_BY</td>
<td>last person who changed or approved the trade</td>
</tr>
<tr>
<td>WeatherML:BOOK</td>
<td>the name of the trading book to which the trade belongs</td>
</tr>
<tr>
<td>WeatherML:TRADE_TYPE</td>
<td>the type of trade - currently OTC or exchange-traded</td>
</tr>
<tr>
<td>WeatherML:PRICING_MODEL</td>
<td>the name of the pricing model which should be used for the valuation of this trade</td>
</tr>
<tr>
<td>WeatherML:FAIR_VALUE</td>
<td>the calculated fair value at trade time</td>
</tr>
<tr>
<td>WeatherML:PREMIUM</td>
<td>the premium - the margin on top of fair value</td>
</tr>
<tr>
<td>WeatherML:PRICE</td>
<td>the final price charged to the customer</td>
</tr>
<tr>
<td>WeatherML:MAX_PAYOUT</td>
<td>the agreed limit - maximum pay-out which applies to the trade</td>
</tr>
<tr>
<td>WeatherML:NOTES</td>
<td>any comments can be stored here</td>
</tr>
<tr>
<td>WeatherML:TradeComp</td>
<td>trade component is a structure in its own right and described in detail below</td>
</tr>
</tbody>
</table>

**Elements in trade component**

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WeatherML:COMPONENT_ID</td>
<td>the unique identifier of the trade component</td>
</tr>
<tr>
<td>WeatherML:TRADE_ID</td>
<td>so that the component can always be matched to its associated trade</td>
</tr>
<tr>
<td>WeatherML:BUYSELL</td>
<td>whether the component was bought or sold</td>
</tr>
<tr>
<td>WeatherML:COMPONENT_TYPE</td>
<td>call or put</td>
</tr>
<tr>
<td>WeatherML:CREATION_DATETIME</td>
<td>the trade date and time</td>
</tr>
<tr>
<td>WeatherML:INPUT_BY</td>
<td>the person who logged the trade (or automatic)</td>
</tr>
<tr>
<td>WeatherML:START_DATE</td>
<td>start of the observation period</td>
</tr>
<tr>
<td>WeatherML:END_DATE</td>
<td>end of the observation period</td>
</tr>
<tr>
<td>WeatherML:PAYMENT_DATE</td>
<td>date when resulting payments are due</td>
</tr>
<tr>
<td>WeatherML:PRIMARY_STATION_W</td>
<td>name of weather station</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>WeatherML:RESERVE1_WMO</td>
<td>first reserve weather station</td>
</tr>
<tr>
<td>WeatherML:RESERVE2_WMO</td>
<td>second reserve weather station</td>
</tr>
<tr>
<td>WeatherML:DATASET_ID</td>
<td>the dataset to be used for pricing, for example, raw data or cleaned</td>
</tr>
<tr>
<td>WeatherML:YEAR_FROM</td>
<td>start year of data to be used for pricing</td>
</tr>
<tr>
<td>WeatherML:YEAR_TO</td>
<td>end year of data to be used for pricing</td>
</tr>
<tr>
<td>WeatherML:VARIABLE</td>
<td>weather type variable (temperature, rainfall, etc.)</td>
</tr>
<tr>
<td>WeatherML:REF_POINT</td>
<td>reference point (in case of temperature typically 65°F or 18°C)</td>
</tr>
<tr>
<td>WeatherML:INDEX</td>
<td>type of index, for example, HDD or CDD</td>
</tr>
<tr>
<td>WeatherML:MEAN</td>
<td>mean of the index over the specified valuation period</td>
</tr>
<tr>
<td>WeatherML:SD</td>
<td>standard deviation of the index over the specified valuation period</td>
</tr>
<tr>
<td>WeatherML:STRIKE</td>
<td>strike level when trade component is an option</td>
</tr>
<tr>
<td>WeatherML:MAX_PAYOUT</td>
<td>limit of payout of the trade component</td>
</tr>
<tr>
<td>WeatherML:TICK</td>
<td>tick size, dollar value of one point of the index</td>
</tr>
<tr>
<td>WeatherML:FAIR_VALUE</td>
<td>fair value of the trade component</td>
</tr>
<tr>
<td>WeatherML:COMP_CALLPUT_TYPE</td>
<td>type of compound option</td>
</tr>
<tr>
<td>WeatherML:COMP_EXERCISE_DATE</td>
<td>exercise date of compound option</td>
</tr>
</tbody>
</table>
WeatherML example trade

This example looks at a typical weather derivative trade - a call option on an HDD index. The underlying HDD index covers most of January and February 2001, and the reference temperature has been set to 18°C, as is usual in Europe. The temperature index is based on Leeds weather station and two other British weather stations have been agreed on as reserves. The tick value is £15,000 and the maximum payout is £750,000.

The option is a sold put option with the strike set at 925 HDDs. The counterparty and the trader’s name have been specified. Many other fields, mainly for internal use have been set.

In WeatherML form, the trade becomes an XML document and as shown below:

```xml
<?xml version="1.0"?>
<!DOCTYPE WeatherML:Document SYSTEM "file:///C:/WeatherML/WeatherMLPrototype.dtd">

  <WeatherML:Trade>
    <WeatherML:TRADE_ID> 1000055 </WeatherML:TRADE_ID>
    <WeatherML:VERSION> 1 </WeatherML:VERSION>
    <WeatherML:ACTION_FLAG> A </WeatherML:ACTION_FLAG>
    <WeatherML:POSITION_TAKER> DJNS </WeatherML:POSITION_TAKER>
    <WeatherML:INPUT_BY> JSMT </WeatherML:INPUT_BY>
    <WeatherML:CP_SHORT> SCTPWR </WeatherML:CP_SHORT>
    <WeatherML:CP_LONG> Scottish Power </WeatherML:CP_LONG>
    <WeatherML:CP_LOC> GLS </WeatherML:CP_LOC>
    <WeatherML:BROKER> ERS </WeatherML:BROKER>
    <WeatherML:SETTLEMENT_INSTRUCTIONS> TO FOLLOW </WeatherML:SETTLEMENT_INSTRUCTIONS>
    <WeatherML:CREATION_TYPE> AUTO </WeatherML:CREATION_TYPE>
    <WeatherML:LAST_INPUT_BY> JSMT </WeatherML:LAST_INPUT_BY>
    <WeatherML:BOOK> ENERGY-1 </WeatherML:BOOK>
    <WeatherML:TRADE_TYPE> OTC </WeatherML:TRADE_TYPE>
    <WeatherML:PRICING_MODEL> WRA-TEMPERATURE </WeatherML:PRICING_MODEL>
    <WeatherML:FAIR_VALUE> 75000 </WeatherML:FAIR_VALUE>
    <WeatherML:PREMIUM> 0 </WeatherML:PREMIUM>
    <WeatherML:PRICE> 88000 </WeatherML:PRICE>
    <WeatherML:MAX_PAYOUT> 500000 </WeatherML:MAX_PAYOUT>
    <WeatherML:NOTES> </WeatherML:NOTES>
  </WeatherML:Trade>

  <WeatherML:TradeComp>
    <WeatherML:COMPONENT_ID> 01 </WeatherML:COMPONENT_ID>
    <WeatherML:TRADE_ID> 1000055 </WeatherML:TRADE_ID>
    <WeatherML:BUYSELL> SELL </WeatherML:BUYSELL>
    <WeatherML:COMPONENT_TYPE> PUT </WeatherML:COMPONENT_TYPE>
    <WeatherML:INPUT_BY> JSMT </WeatherML:INPUT_BY>
  </WeatherML:TradeComp>
</WeatherML:Document>
```
Development of WeatherML Data Standard Specification

The Development Timetable for the WeatherML initiative is outlined in the WeatherML Overview document.

The development of a draft version of the WeatherML Data Standard Specification will be completed during the WeatherML requirements capture phase, which runs to end of December 2000.

It will be split into a further five stages, as shown below:

<table>
<thead>
<tr>
<th>Version</th>
<th>Item</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>v0.2</td>
<td>Specification of cash flows and weather indices (HDDs, etc.)</td>
<td>08-Jan-2001</td>
</tr>
<tr>
<td>v0.3</td>
<td>Generic options definition</td>
<td>15-Jan-2001</td>
</tr>
<tr>
<td>v0.4</td>
<td>Addition of all commonly traded weather derivatives</td>
<td>29-Jan-2001</td>
</tr>
<tr>
<td>v0.5</td>
<td>Definitions of forthcoming trade types</td>
<td>12-Feb-2001</td>
</tr>
<tr>
<td>v0.6</td>
<td>Integration of information other than trades (for example, foreign exchange and interest rates, weather data, weather stations, etc.)</td>
<td>26-Feb-2001</td>
</tr>
</tbody>
</table>

Interim versions of the draft WeatherML Data Standard Specification will be released during this time, and feedback will be incorporated into subsequent versions.
Further information

This document and other information relating to WeatherML is available on the internet at www.WeatherML.org. The WeatherML website is currently a private site. To log-in, the username is “weatherml” and the password is “protocol”.

The WeatherML concept is being co-ordinated by Weather Risk Advisory, an independent consulting and software company specializing in weather derivatives.

WeatherML will be developed in conjunction with a group of key organizations in the global weather derivatives market.

A WeatherML Steering committee will be created to define the standard’s scope and direct its progress.

Standards and Technical sub-committees will be formed with responsibilities for business issues and technical implementation respectively. A number of special interest groups may also be created from time to time to consider specific issues.

- WeatherML Steering Committee – to define the standard’s scope and direct its progress
- WeatherML Standards Committee – to focus on business issues and data definitions
- WeatherML Technical Committee – to address systems and implementation issues

For further information, or to discuss joining the WeatherML initiative, please contact one of the following Weather Risk Advisory staff, on tel +44 (0) 1954 206 246 or by e-mail:

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Peter Brewer  Steering Committee steering@WeatherML.org
Jürgen Gaiser-Porter  Standards Committee standards@WeatherML.org
Terms and conditions

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Appendix

The WeatherML DTD is printed in full here.

WeatherML DTD

<!ELEMENT WeatherML:Document (WeatherML:Trade*)>
<!ELEMENT WeatherML:TRADE_ID (#PCDATA)>
<!ELEMENT WeatherML:VERSION (#PCDATA)>
<!ELEMENT WeatherML:ACTION_FLAG (#PCDATA)>
<!ELEMENT WeatherML:CREATION_DATETIME (#PCDATA)>
<!ELEMENT WeatherML:POSITION_TAKER (#PCDATA)>
<!ELEMENT WeatherML:CP_SHORT (#PCDATA)>
<!ELEMENT WeatherML:CP_LONG (#PCDATA)>
<!ELEMENT WeatherML:CP_LOC (#PCDATA)>
<!ELEMENT WeatherML:BROKER (#PCDATA)>
<!ELEMENT WeatherML:SETTLEMENT_INSTRUCTIONS (#PCDATA)>
<!ELEMENT WeatherML:CREATION_TYPE (#PCDATA)>
<!ELEMENT WeatherML:LAST_INPUT_BY (#PCDATA)>
<!ELEMENT WeatherML:BOOK (#PCDATA)>
<!ELEMENT WeatherML:TRADE_TYPE (#PCDATA)>
<!ELEMENT WeatherML:PRICING_MODEL (#PCDATA)>
<!ELEMENT WeatherML:FAIR_VALUE (#PCDATA)>
<!ELEMENT WeatherML:PREMIUM (#PCDATA)>
<!ELEMENT WeatherML:PRICE (#PCDATA)>
<!ELEMENT WeatherML:MAX_PAYOUT (#PCDATA)>
<!ELEMENT WeatherML:NOTES (#PCDATA)>
<!ELEMENT WeatherML:COMPONENT_ID (#PCDATA)>
<!ELEMENT WeatherML:BUYSELL (#PCDATA)>
<!ELEMENT WeatherML:COMP_CALLPUT_TYPE (#PCDATA)>
<!ELEMENT WeatherML:COMP_EXERCISE_DATE (#PCDATA)>
<!ELEMENT WeatherML:COMPONENT_TYPE (#PCDATA)>
<!ELEMENT WeatherML:START_DATE (#PCDATA)>
<!ELEMENT WeatherML:END_DATE (#PCDATA)>
<!ELEMENT WeatherML:PAYMENT_DATE (#PCDATA)>
<!ELEMENT WeatherML:PRIMARY_STATION_WMO (#PCDATA)>
<!ELEMENT WeatherML:RESERVE1_WMO (#PCDATA)>
<!ELEMENT WeatherML:RESERVE2_WMO (#PCDATA)>
<!ELEMENT WeatherML:DATASET_ID (#PCDATA)>
<!ELEMENT WeatherML:YEAR_FROM (#PCDATA)>
<!ELEMENT WeatherML:YEAR_TO (#PCDATA)>
<!ELEMENT WeatherML:VARIABLE (#PCDATA)>
<!ELEMENT WeatherML:REF_POINT (#PCDATA)>
<!ELEMENT WeatherML:INDEX (#PCDATA)>
<!ELEMENT WeatherML:MEAN (#PCDATA)>
<!ELEMENT WeatherML:SD (#PCDATA)>
<!ELEMENT WeatherML:STRIKE (#PCDATA)>
<!ELEMENT WeatherML:TICK (#PCDATA)>
<!ELEMENT WeatherML:COMP_CALLPUT_TYPE (#PCDATA)>
<!ELEMENT WeatherML:COMP_EXERCISE_DATE (#PCDATA)>