Data Standard Specification

Draft v0.1

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<u>Executive summary</u>

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.

Element	Description
WeatherML:Document	this is the top-level entry point in WeatherML, which can contain one or more trades
WeatherML:Trade	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

Elements in trade

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

Element	Description
WeatherML:TRADE_ID	a unique identifier for the trade (the ticket)
WeatherML:VERSION	the WeatherML version number, which will be needed once more than one version of WeatherML is available
WeatherML:ACTION_FLAG	describes the trade status, used to specify the

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

Elements in trade component

Element	Description
WeatherML:COMPONENT_ID	the unique identifier of the trade component
WeatherML:TRADE_ID	so that the component can always be matched to its associated trade
WeatherML:BUYSELL	whether the component was bought or sold
WeatherML:COMPONENT_TYPE	call or put
WeatherML:CREATION_DATETIME	the trade date and time
WeatherML:INPUT_BY	the person who logged the trade (or automatic)
WeatherML:START_DATE	start of the observation period
WeatherML:END_DATE	end of the observation period
WeatherML:PAYMENT_DATE	date when resulting payments are due

WeatherML:PRIMARY_STATION_W	name of weather station
WeatherML:RESERVE1_WMO	first reserve weather station
WeatherML:RESERVE2_WMO	second reserve weather station
WeatherML:DATASET_ID	the dataset to be used for pricing, for example, raw data or cleaned
WeatherML:YEAR_FROM	start year of data to be used for pricing
WeatherML:YEAR_TO	end year of data to be used for pricing
WeatherML:VARIABLE	weather type variable (temperature, rainfall, etc.)
WeatherML:REF_POINT	reference point (in case of temperature typically 65°F or 18°C)
WeatherML:INDEX	type of index, for example, HDD or CDD
WeatherML:MEAN	mean of the index over the specified valuation period
WeatherML:SD	standard deviation of the index over the specified valuation period
WeatherML:STRIKE	strike level when trade component is an option
WeatherML:MAX_PAYOUT	limit of payout of the trade component
WeatherML:TICK	tick size, dollar value of one point of the index
WeatherML:FAIR_VALUE	fair value of the trade component
WeatherML:COMP_CALLPUT_TYPE	type of compound option
WeatherML:COMP_EXERCISE_DATE	exercise date of compound option

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 version="1.0"?>

<!DOCTYPE WeatherML:Document SYSTEM
"file:///C:/WeatherML/WeatherMLPrototype.dtd">

<WeatherML:Document
xmlns:WeatherML="http://www.weatherriskadvisory.com/xml/">

  <WeatherML:Trade>

    <WeatherML:TRADE_ID> 1000055 </WeatherML:TRADE_ID>
    <WeatherML:VERSION> 1 </WeatherML:VERSION>
    <WeatherML:ACTION_FLAG> A </WeatherML:ACTION_FLAG>
    <WeatherML:CREATION_DATETIME>
            14-Jul-2000 17:13:21
      </WeatherML:CREATION_DATETIME>
    <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: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:CREATION_DATETIME>
              14-Jul-2000 17:14:58
          </WeatherML:CREATION_DATETIME>
      <WeatherML:INPUT_BY> JSMT </WeatherML:INPUT_BY>
```

```
        <WeatherML:START_DATE> 07-Jan-2001 </WeatherML:START_DATE>
        <WeatherML:END_DATE> 28-Feb-2001 </WeatherML:END_DATE>
        <WeatherML:PAYMENT_DATE></WeatherML:PAYMENT_DATE>
        <WeatherML:PRIMARY_STATION_WMO> 03347
             </WeatherML:PRIMARY_STATION_WMO>
        <WeatherML:RESERVE1_WMO> 03334 </WeatherML:RESERVE1_WMO>
        <WeatherML:RESERVE2_WMO> 03535 </WeatherML:RESERVE2_WMO>
        <WeatherML:DATASET_ID> 11 </WeatherML:DATASET_ID>
        <WeatherML:YEAR_FROM> 1975 </WeatherML:YEAR_FROM>
        <WeatherML:YEAR_TO> 1999 </WeatherML:YEAR_TO>
        <WeatherML:VARIABLE> TEMPERATURE </WeatherML:VARIABLE>
        <WeatherML:REF_POINT> 18 </WeatherML:REF_POINT>
        <WeatherML:INDEX> Heating Degree Days </WeatherML:INDEX>
        <WeatherML:MEAN> 0 </WeatherML:MEAN>
        <WeatherML:SD> 0 </WeatherML:SD>
        <WeatherML:STRIKE> 925 </WeatherML:STRIKE>
        <WeatherML:MAX_PAYOUT> 750000 </WeatherML:MAX_PAYOUT>
        <WeatherML:TICK> 15000 </WeatherML:TICK>
        <WeatherML:FAIR_VALUE> 67000 </WeatherML:FAIR_VALUE>
        <WeatherML:COMP_CALLPUT_TYPE> </WeatherML:COMP_CALLPUT_TYPE>
        <WeatherML:COMP_EXERCISE_DATE> </WeatherML:COMP_EXERCISE_DATE>

    </WeatherML:TradeComp>

  </WeatherML:Trade>

</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:

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

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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Appendix

The WeatherML DTD is printed in full here.

WeatherML DTD

```
<!ELEMENT WeatherML:Document (WeatherML:Trade*)>

<!ELEMENT WeatherML:Trade (WeatherML:TRADE_ID, WeatherML:VERSION,
WeatherML:ACTION_FLAG, WeatherML:CREATION_DATETIME,
WeatherML:POSITION_TAKER, WeatherML:INPUT_BY, WeatherML:CP_SHORT,
WeatherML:CP_LONG, WeatherML:CP_LOC, WeatherML:BROKER,
WeatherML:SETTLEMENT_INSTRUCTIONS, WeatherML:CREATION_TYPE,
WeatherML:LAST_INPUT_BY, WeatherML:BOOK, WeatherML:TRADE_TYPE,
WeatherML:PRICING_MODEL, WeatherML:FAIR_VALUE, WeatherML:PREMIUM,
WeatherML:PRICE, WeatherML:MAX_PAYOUT, WeatherML:NOTES,
WeatherML:TradeComp*)>

<!ELEMENT WeatherML:TradeComp (WeatherML:COMPONENT_ID,
WeatherML:TRADE_ID, WeatherML:BUYSELL, WeatherML:COMPONENT_TYPE,
WeatherML:CREATION_DATETIME, WeatherML:INPUT_BY,
WeatherML:START_DATE, WeatherML:END_DATE, WeatherML:PAYMENT_DATE,
WeatherML:PRIMARY_STATION_WMO, WeatherML:RESERVE1_WMO,
WeatherML:RESERVE2_WMO, WeatherML:DATASET_ID, WeatherML:YEAR_FROM,
WeatherML:YEAR_TO, WeatherML:VARIABLE, WeatherML:REF_POINT,
WeatherML:INDEX, WeatherML:MEAN, WeatherML:SD, WeatherML:STRIKE,
WeatherML:MAX_PAYOUT, WeatherML:TICK, WeatherML:FAIR_VALUE,
WeatherML:COMP_CALLPUT_TYPE, WeatherML:COMP_EXERCISE_DATE)>

<!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:COMPONENT_TYPE (#PCDATA)>
<!ELEMENT WeatherML:INPUT_BY (#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)>
```