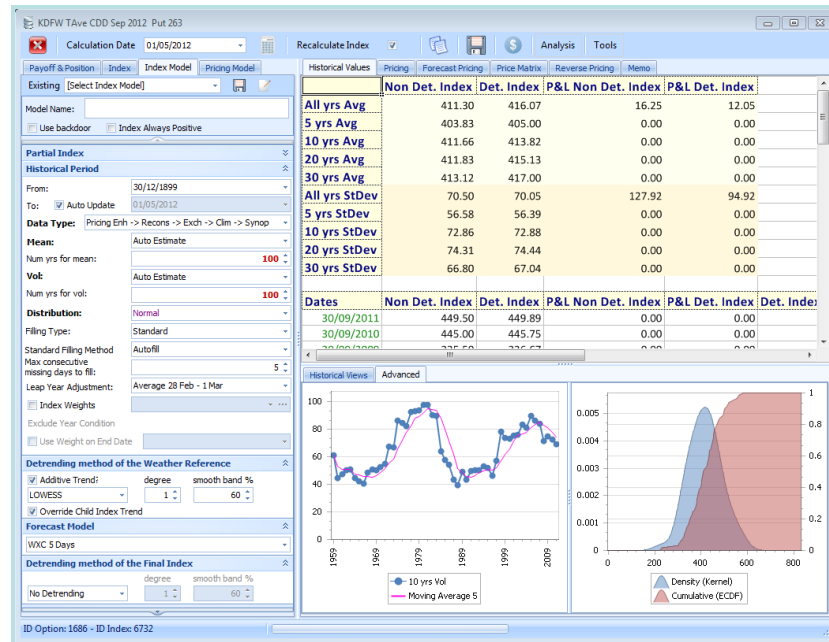


Speedwell Weather



SWS is an enterprise software application for pricing weather risk contracts, managing a portfolio of weather risk contracts and managing historical weather data and feeds.

Speedwell Weather
Speedwell Weather System



An Introduction



About SWS

SWS is an enterprise system used by traders of parametric weather-risk contracts since 2002. It provides front, middle and back office support



About SWS: Software components

SWS includes these software elements:

- SWS Oasis Desktop for pricing/portfolio management/back office
- SWS Data Manager for management of weather data / forecasts and for configuring permissions and the scheduling of automatic reports
- SWS Contracts and Invoices module (SWS Enterprise only)
- APS Module: user configurable to allow fully automated responses to pricing requests
- SQL Server Database for weather data / forecasts and commodity data: fully integrated with Speedwell SuperPack® unlimited weather data licence



About SWS: Key Features

SWS enables you to:

- Price weather risk contracts and provide analysis including gas “quantos”
- Manage portfolios of risk and create risk reports
- Manage contracts, invoices, settlement
- Manage historical weather data, feeds and forecasts (including gridded data)
- Help meet regulatory requirements
- *New in SWS Vs 12:*
 - streamlined response to weatherXchange® RFPs*
 - seamless integration with new weatherXchange tradeable sites database
 - optional integration with configurable Automated Pricing Service. This allows fully automated responses to weatherXchange RFPs
 - direct API based access to gridded data, subject to data licence

*weatherXchange® is an independent platform which helps companies access index-based weather protection. It is free-to-use by Hedgers

RFPs are Requests for Pricing sent in machine readable weatherML format

weatherML is a mark-up language used for encoding the terms sheets of both simple and complex weather derivatives





A multi-user, enterprise-wide solution

Traders, Risk Officers, Legal Officers, Back Office, ...

- Weather Derivative Pricing
- Deal Booking, Confirmations and legal doc management
- Portfolio P&L and Risk Measures
- Data Management – ad hoc import and quality control
- Correlation analysis
- Weather dependency analysis
- Settlement, Invoicing, EMIR, Dodd Frank Reporting

...



Database Server
(MS SQL Server)



weatherXchange **Integration**
 Requests For Pricing streamlined
 Optional Automated Pricing Service for
 weatherXchange RFP
 Online Data Streaming



SWS Application Server

Continuous Data and Forecast Imports
from multiple data providers

End of Day Tasks:

- Settlement Calculations
- Daily and Expiry VaR
- P&L reports
- Credit Risk Reports



System Administrator

- Set up Users
- Manage Permissions
- Importation of additional data e.g. gas / power data

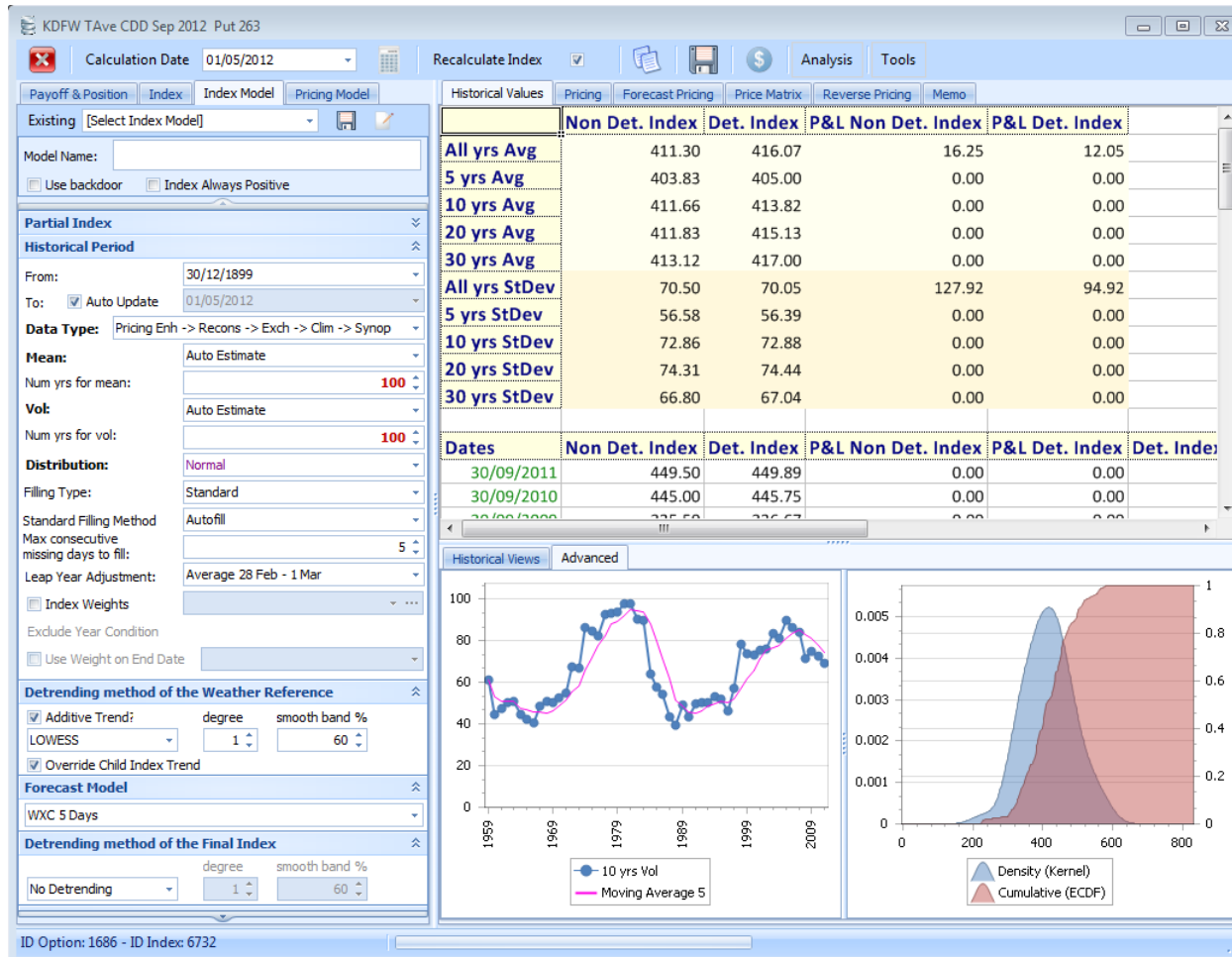




Front Office



Pricing a Weather Derivative



SWS enables you to price standard and ultra exotic weather derivatives by providing a “tool box” of modelling options.

The user can choose multiple detrending methods, distribution fitting methods, leap year adjustments. Historic data and forecasts (if specified) can also be automatically incorporated.

A mixed actuarial / market approach can also be applied. Eg using a market level for the underlying swap to price options.

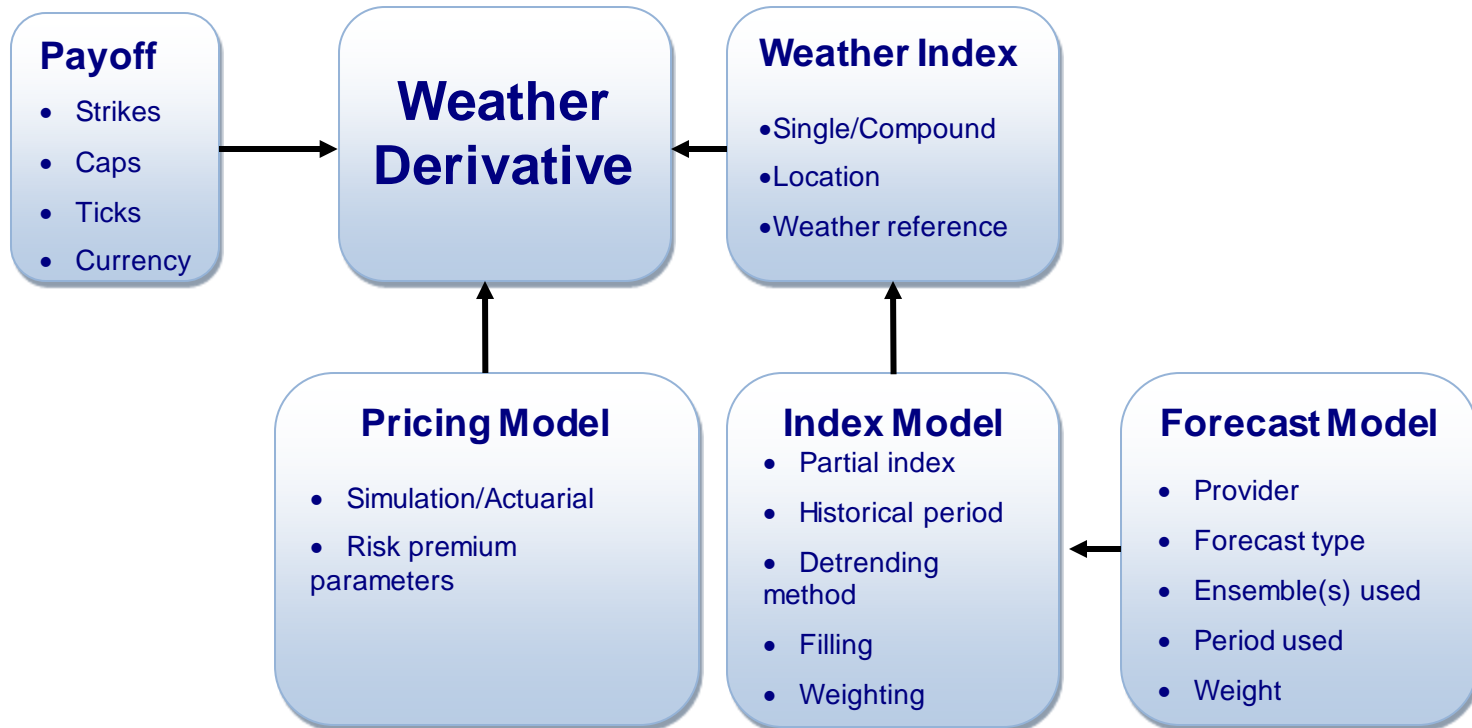
Simulation of temperature and rainfall process also available



Pricing a Weather Derivative

The SWS Object Model

All elements are user configurable





Index Structure Support

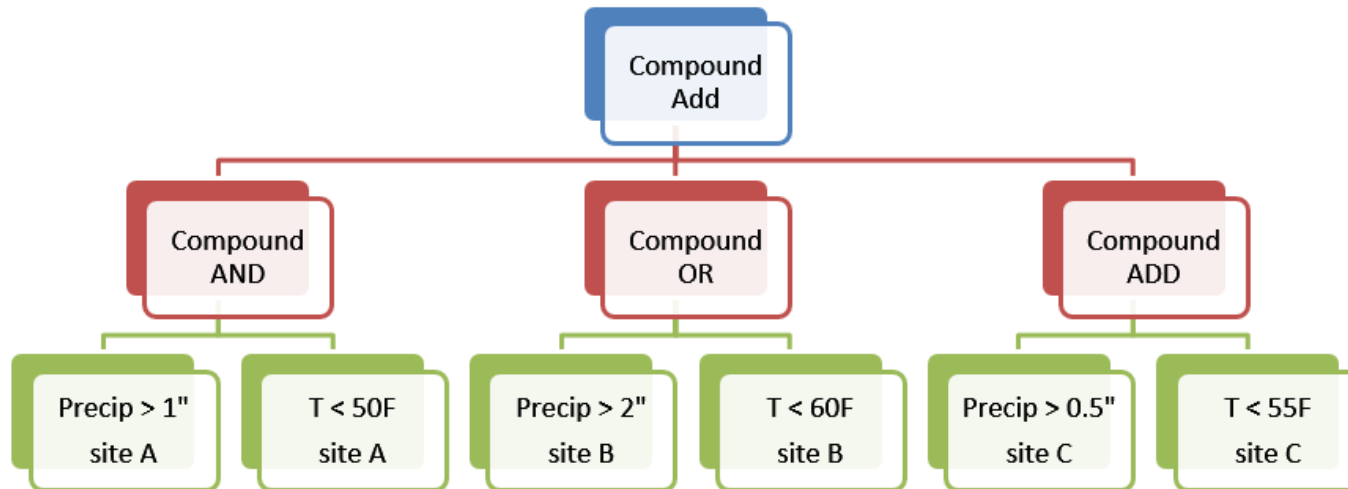
- Daily / Hourly / sub Hourly Indexes
- Basket Indexes
- Compound Indexes e.g. Wind + Temp
- Multiple stations (baskets, any weights)
- Mix of daily and hourly variables
- Super exotics
- Strips – multi year, month, flexi
- Power Curve Builder Scripting Tool: simplifies the transformation of a wind turbine power curve table into an SWS-compatible index for weighting wind speeds
- Gas-Quanto pricer using daily temperature simulation and gas price simulation (mean-reverting with jump process)





Compound Indices

SWS supports super-exotic structures by allowing complex compounding





Complex Trades: C# Script

The new C# engine simplifies and speeds up complicated index calculations.

It allows access to the SWS database to allow climatologies for a station to be retrieved, for example. All data points in the current risk period are passed in to the calculation function, allowing:

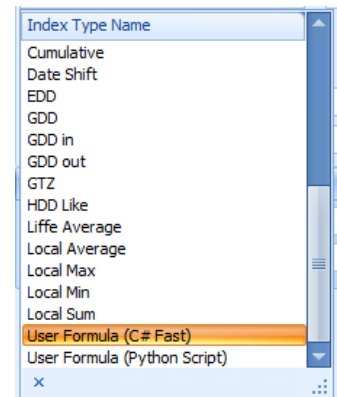
- Entering an index to calculate the departure from normal for an automatically-calculated normal curve ...this can be done in just a few lines
- Returning the average of an index value for this year and previous year
- Returning the sum of the 10 smallest values in the risk period
- Calculating indices that are path dependent (eg the average of current year and previous year)

```
// example 2: Return on the last day the average value of the period
if (MeasDate == DataDates[DataDates.Length-1])
    return Average(DataValues[0]);
else
    return 0.0;

// example 3: Return On the last day the sum of the 10 smallest values
if (MeasDate == DataDates[DataDates.Length-1])
{
    var r = (from d in DataValues[0]
            orderby d ascending
            select d).Take(10);
    return r.Sum();
}
else
    return 0.0;

// example 4: Returns where possible the average of the value and 1
if (m_DDL == null)
    m_DDL = GetFullHistory(2082, 10);
DateTime wPrevYear = MeasDate.AddYears(-1);
if (m_DDL.ContainsDate(wPrevYear))
    return (m_DDL[wPrevYear].Value + WR[0]) / 2.0;
else
    return WR[0];

// example 5: Calculate the departure from Normal
if (m_Climatology == null)
{
    LoadClimatology(2082, 10);
}
return DifferenceVsClimatology(MeasDate, WR[0]);
```





Gas Quantos

SWS 12 now supports
Delta T * Delta P type gas-
settled quantos

Pricing uses rebased
historical data and quanto
specific simulation.

Both temperature and the
commodity are simulated on
a daily basis that respects:

- temperature process
- gas process
- forward curves
- correlations

Home Data & Forecast Back Office Middle Office Market Pricing Portfolios

Multi Model Pricer Spread Calculator
Periodic Index Publisher Index Position Analysis
Black 76 Pricer Roll Pricing Wizard

DeltaP x DeltaT Pricer

Calculation Date 19/06/2017

Commodity Settings Weather Element Settings Contract Settings Internal Model Pricing Memo

Please enter below the data and settings that will be used to rebase the commodity price to current forward curve and past weather scenarios

Commodity Price Data

Historical Data

Station EEX NCG
Element Gas Day Ahead Price

Index Model

L80 - No 4cast - Normal

The Commodity Curve must be at least a year long, cover the entire contract period and have no missing day
The Data Type should not include a reconstructed series since the historical correlation would not be correctly estimated.



Building Power Curves

Script Builder

Please select the type of script you would like to create:

Step Function
 Linear Interpolation

This screen helps quickly create Formula script for Steps and Linear Interpolated type of indices.

A step index takes constant values between various ranges.
 As an example it could be defined as:
 * If weather value between 0 and 5 exclusive the index value is say 10
 * If weather value between 5 and 10 exclusive the index value is say 100
 * If weather value between 50 and 100 exclusive the index value is say 1000
 * elsewhere the converted value will be zero

	A	B	C	D	E	F	G	H	I	J	K
1	Input Value	Index Value									
2		0	0								
3		1	0								
4		2	0								
5		3	0								
6		4	0.14								
7		5	0.26								
8		6	0.43								
9		7	0.65								
10		8	0.85								
11		9	1.05								
12		10	1.23								
13		11	1.32								
14		12	1.31								
15		13	1.2								
16		14	1.05								

Copy Power Curve

Press Create Script

Create Script

Once the script is generated, simply copy and paste the script into the index formula box.

LinIntExt(0,0,1,0,1,0,WR1)+LinIntExt(1,0,2,0,1,0,WR1)+LinIntExt(2,0,3,0,1,0,WR1)+LinIntExt(3,0,4,0,14,1,0,WR1)+LinIntExt(4,0,14,5,0,26,1,0,WR1)+LinIntExt(5,0,26,6,0,43,1,0,WR1)+LinIntExt(6,0,43,7,0,65,1,0,WR1)+LinIntExt(7,0,65,8,0,85,1,0,WR1)+LinIntExt(8,0,85,9,1,05,1,0,WR1)+LinIntExt(9,1,05,10,1,23,1,0,WR1)+LinIntExt(10,1,23,11,1,32,1,0,WR1)+LinIntExt(11,1,32,12,1,31,1,0,WR1)+LinIntExt(12,1,31,13,1,2,1,0,WR1)+LinIntExt(13,1,2,14,1,05,1,0,WR1)+LinIntExt(14,1,05,15,0,9,1,0,WR1)+LinIntExt(15,0,9,16,0,75,1,0,WR1)+LinIntExt(16,0,75,17,0,6,1,0,WR1)+LinIntExt(17,0,6,18,0,45,1,0,WR1)+LinIntExt(18,0,45,19,0,3,1,0,WR1)+LinIntExt(19,0,3,20,0,15,1,0,WR1)+LinIntExt(20,0,15,21,0,1,1,WR1)

SWS-readable index created to transform wind speed

Script Builder

Please select the type of script you would like to create:

Step Function
 Linear Interpolation

This screen helps quickly create Formula script for Steps and Linear Interpolated type of indices.

A step index takes constant values between various ranges.
 As an example it could be defined as:
 * If weather value between 0 and 5 exclusive the index value is say 10
 * If weather value between 5 and 10 exclusive the index value is say 100
 * If weather value between 50 and 100 exclusive the index value is say 1000
 * elsewhere the converted value will be zero

Turbine Data

Northern Power 100 21m 100kw (Manufacturer's table)

Northern Power 100 21m 100kw (Manufacturer's table)
 Northern Power 100-24 (Manufacturer's table)
 Pinnacle-Tech Caravel 2.5kW 3.5m (Manufacturer's graph)
 PowerWind 56-500 56m 500kw (Manufacturer's table)
 Quiet Revolution qr5 6kW VAWT (Grid) (Manufacturer's graph)
 ReDriven 3.8m 3kw (Manufacturer's graph)
 ReDriven 3.8m 3kw (30 percent max efficiency)
 Repower 126m-5Ww
 RepowerMM82 82m-3Ww
 RepowerMM92 92.5m-2000kw
 Samrey Merlin_3.5m_3kw (MG)
 Samrey Mistral_2m_1.15kw(MG)
 Samrey Wren_1m_0.3kw(MG)
 Sirocco E5.6m-6kw (Manufacturer's table)
 Servnion 3.2mW 114m (Manufacturer's graph)
 Servnion 3.4mW 114m (Manufacturer's graph)

Once the script is generated, simply copy and paste the script into the index formula box.

SWS incorporates a Power Curve Builder Scripting Tool.
 This makes it easy to transform a wind speed index into a power index
 The power curve for over 200 turbine types is pre-loaded



SWS Pricing and Settlement Hierarchies: Hiding Complexity

ID	Description
1002	Pricing Enh -> Recons -> Exch -> Clim ...
1004	Settlement (Exch -> Clim -> Synop)
1006	CLIMATE all
1007	SYNOP all
1008	Recalibrated -> Recons
1009	Pricing Recons -> Exch -> Clim -> Synop
1010	Pricing Recal -> Recons -> Exch -> Cli...

SWS Pricing Hierarchies ensure that the best data are automatically loaded for contract pricing and that settlement automatically data is automatically picked up as soon as the risk period starts

In a nutshell:

- Data are easy to use
- Multiple data types allow full understanding of data provenance and quality
- Hierarchies mean that processing of those data types is simplified but fully transparent



Analysis Tools

- Reverse Pricing
- Time Series Analysis
- Multi-model analysis
- Distribution fitting
- Index model analysis
- Burn analysis
- Correlation analysis
- “Cone chart”



Middle Office: Portfolio Risk Management



Portfolios

SWS supports four types of portfolios:

- *Real Portfolios* are the portfolios that contain actual executed transactions.
- *Working Portfolios* are “throw away” portfolios and can be used for analysis (eg marginal impact of a proposed transaction).
- *Mirrored Portfolios* are working portfolios that mirror a real portfolio but for which a different portfolio risk model is attached to for analysis or reporting purposes.
- *The Enterprise Portfolio* is the portfolio made of all Real Portfolios

There is no limit to the number of Portfolios

SWS uses client-specific portfolios to create credit risk reports



Portfolio and Risk Reports

- Historical
- Simulations
- PL
- Expiry VaR
- Daily VaR
- Markowitz Charts
- PCA
- SSD

These reports are easily exported, may be automatically run on a schedule and emailed. They can be used for integration with internal risk and back office systems

Speedwell Weather System - Oasis Desktop

Weather Index List | List of Weather Derivatives | EGLTAVE.HDD.Feb.2012.Cal.100 | Portfolios List | Portfolio Profit and Loss and Expiry VaR Reports

Risk Model | Previous Day Report | 01/02/2012

Portfolio | Calculations Summary | P&L and Expiry VaR Reports | Markowitz Analysis | Saved Reports

1 SWS transaction Report published on: 02/02/2012 17:39:37
2 Calculation Date: 02/02/2012
3

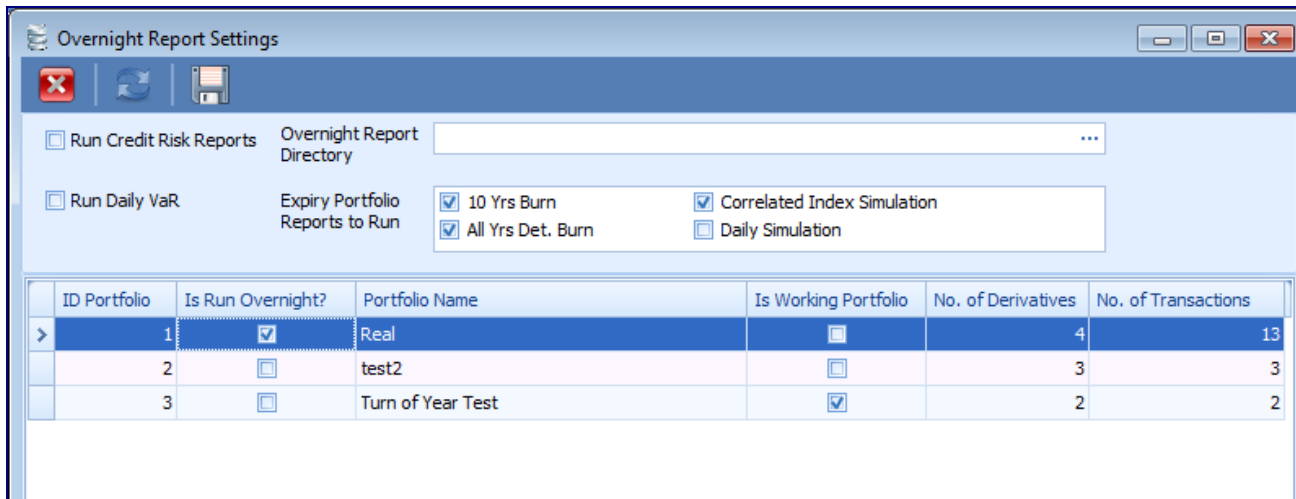
ID	Transaction	Trade Date	Trade Parts	Settlement Date	Post Settlement Date	Parts Settled	Is Settled?
4							
5	1 OPTION Listed	12/01/2012	1	05/04/2012	29/06/2012	0 / 1	FALSE
6	2 OPTION OTC	12/01/2012	1	05/01/2021	31/03/2021	0 / 1	FALSE
7	3 OPTION Listed	12/01/2012	1	06/02/2012	30/04/2012	0 / 1	FALSE
8	5 OPTION Listed	12/01/2012	3	05/04/2012	29/06/2012	3-Feb	FALSE
9	6 OPTION Listed	13/01/2012	1	05/04/2012	29/06/2012	0 / 1	FALSE
10	7 OPTION OTC	13/01/2012	1	05/01/2012	30/03/2012	1-Jan	TRUE
11	24 SWAP Listed	27/01/2012	1	05/04/2012	29/06/2012	0 / 1	FALSE
12	25 SWAP Listed	27/01/2012	1	05/04/2012	29/06/2012	0 / 1	FALSE
13	26 SWAP Listed	27/01/2012	1	05/07/2011	28/09/2011	1-Jan	TRUE
14	27 SWAP Listed	27/01/2012	1	05/07/2011	28/09/2011	1-Jan	TRUE
15	32 SWAP Listed	02/02/2012	1	05/04/2012	29/06/2012	0 / 1	FALSE
16	33 OPTION Listed	02/02/2012	1	20/02/2012	14/05/2012	0 / 1	FALSE
17							
18							
19							
20	Reporting	Amount	Realised P&L	Unrealised P&L			
21	Total P&L From Inception (USD, Actual FX Rates)	-44505432.33	-33.00	-44505399.33			
22	Total P&L From Inception (USD, Current FX Rates)	-44505432.33	-33.00	-44505399.33			
23	Total P&L From Last Year End (USD, Actual FX Rates)	-44505432.33	-33.00	-44505399.33			
24	Total P&L From Last Year End (USD, Current FX Rates)	-44505432.33	-33.00	-44505399.33			
25	Total P&L From Last Reval (USD, Actual FX Rates)	-44505432.33	-33.00	-44505399.33			
26	Total P&L From Last Reval (USD, Current FX Rates)	-44505432.33	-33.00	-44505399.33			
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							

Done.

Connected to: SPEED_TEST_2 on: WEATHERDATABASE.WEATHER | Open Windows | Tabbed | Skin Picker



Automating Portfolio Calculations



Application exe name	Main Parameter	Action
SWSDesktop	/OVERNIGHT	Automatic portfolio and risk calculations



Back Office and Invoicing



Summary of Back Office Functionality

- Flow of the weather trade (notification of each stage)
- Generation of confirms
- Generation of invoices
- Payment reports
- Settlement reports
- Export of reports to Excel®
- Trade query
- Static data maintenance – counterparty details...

Microsoft Windows, SQL Server, Excel, Word and PowerPoint are trademarks of the Microsoft Corporation



Full Support for the Trade Life-Cycle

Take control of the entire trade flow

Weather Index List | List of Weather Derivatives | EGLL TAve HDD Feb 2012 Call 100 | Portfolios List | Portfolio Profit and Loss and Expiry VaR reports | List of Weather Derivatives | Transaction Booking | Transaction List

Display Transaction Types: Real (selected), Fictitious. Show Only: Ready for Calculation. Show Changes to Transaction: . Show Deleted Transactions: .

Copy to Working Portfolio: [Select Portfolio]. Move To Portfolio: [Select Portfolio].

ID Transaction	ID Option	Listed?	Trade Type	Strip Type	Weather Reference	Station	Type Of Option	Strike	Tick	Cap (Tick)	Trader	Buyer	Seller	Transaction Date
23	1646	<input type="checkbox"/>	OPTION	Single	Temperature Min	MANCHESTER (Woodford)	Call (NO cap)	1000	5000		Trial	Speedwell Weather D...	Merril Lynch UK (E...	24/01/2012

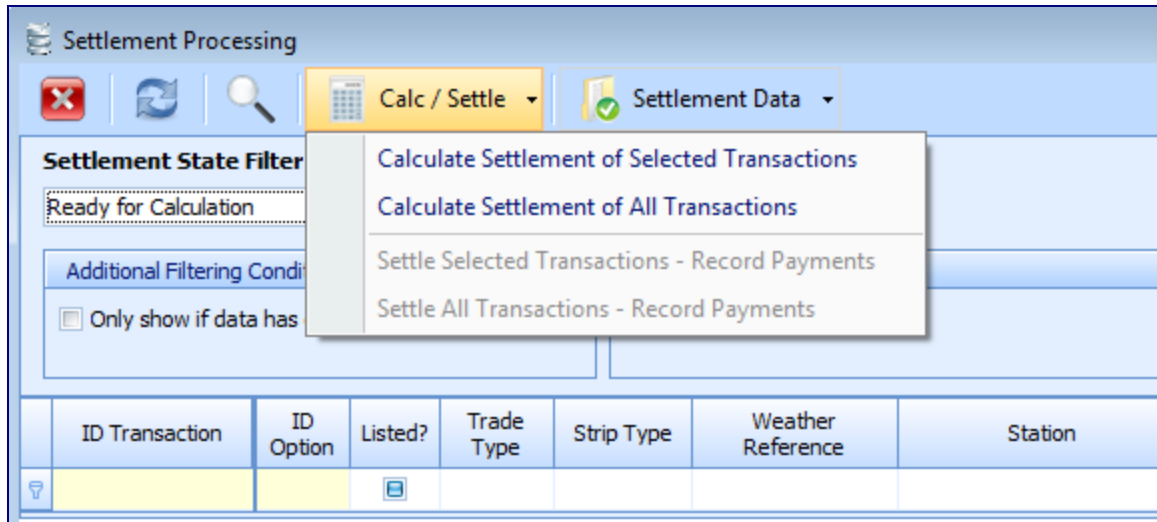
ID Transaction	Part	Premium Cashflow	Period Start	Period End	Calculation Date	Settlement Date	Settlement Index	Settlement Payoff	Post Settlement Date	Post Settlement Index	Post Settlement Payoff	Premium Exchanged?	Settlement Paid?	Post Settlement Paid?
23	1	5432.0000	01/09/2011	31/12/2011	05/01/2012	05/01/2012			30/03/2012			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Transaction List | Transaction Life Cycle Status List

Position	Status Name	Is Visible?	Payment Occurring?	Applies to each Transaction Parts?
0	Contract is sent	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Contract is signed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Premium is exchanged	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	Broker's fees are paid	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Settlement is paid	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	Post Settlement is paid	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Automatic Batch Processing of Trades



- Configure SWS to automatically calculate and settle trades at the end of each day
- Never forget a trade
- Additional optional components available to further automate trade processing



Automatic Notifications

Configure Email Notification

Send report via email on FTP download / data import

Always: Notify Email: Maintenance@speedwell.net

If FTP download error Email Subject Prefix: [STVG App Server 2]

If data import error

Send Email on Action

Transaction Booked: ian.brookes@speedwellweather.com

Transaction Edited: ian.brookes@speedwellweather.com

Transaction moved or removed from portfolio: ian.brookes@speedwellweather.com

End of Day Portfolio PL & VaR Report: ian.brookes@speedwellweather.com

End of Day Credit Risk Report: ian.brookes@speedwellweather.com

End of Day Batch Calculation: ian.brookes@speedwellweather.com

End of Day Batch Settlement: ian.brookes@speedwellweather.com

Missing Payment Report: ian.brookes@speedwellweather.com

Speedwell Reporting

URL: http://www.speedwellweather.com:9334/Speedwell.ReportService.svc/mex

Email: production@speedwell.net

Common Email Settings

SMTP Server: SMTP.SAL.LOCAL

Email Sender Address: Production@speedwell.net

OK Cancel



Booking a Weather Trade:

SWS immediately does the following:

- Locks up for editing/deleting the Weather Derivative
- Sends an internal message to SWS desktops
- Makes available the Transaction in the Back Office
- Integrates the Transaction in P&L, VaR, Credit Reports, etc

Only a person with Back Office privileges can:

- Edit the Transaction (e.g. Premium/Transaction Date)
- Mark the Transaction as deleted (the Transaction is never physically deleted from the DB)
- Record statuses
- Record payments
- Settle the Transaction
- Remove the Transaction from the assigned portfolio



Weather Data Support



Data Support

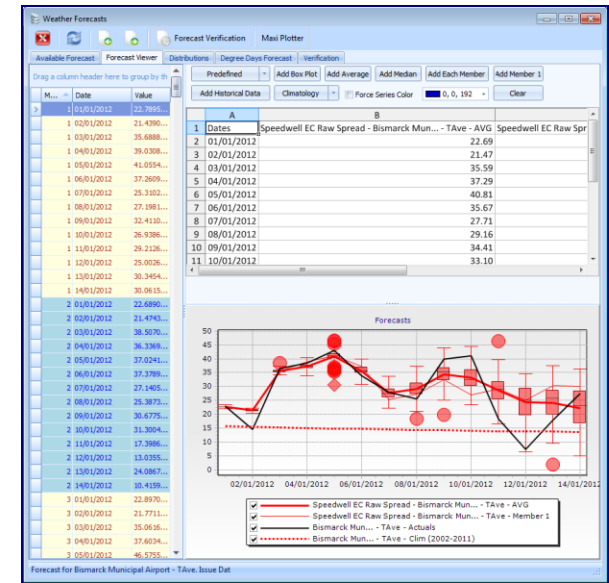
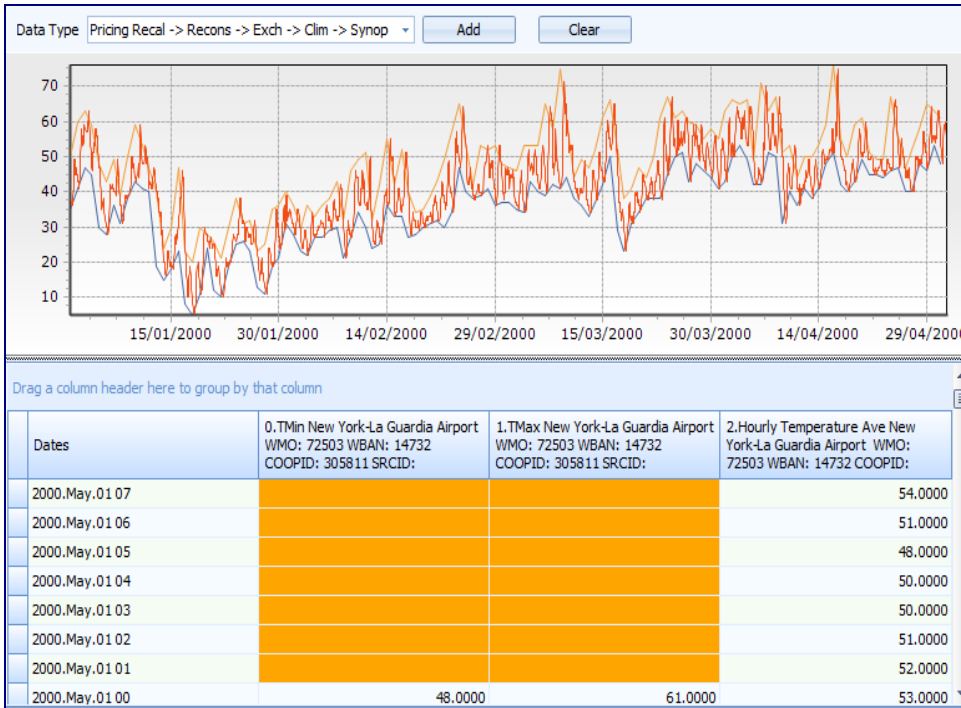


- The SWS data base supports any daily, hourly or sub hourly time series. The data does not even have to be weather related ..eg it could be commodity price data
- Any new 'weather element' can be added at a press of a button
- SWS supports multiple data types and hierarchies
- SWS supports deterministic and ensemble forecasts
- API access to tradeable weatherXchange data sets
- Direct Access to Speedwell Forecast Archive: archived forecasts can be viewed and imported into SWS.
- Gridded Data Services integration: direct access to several gridded data catalogues supported by Speedwell

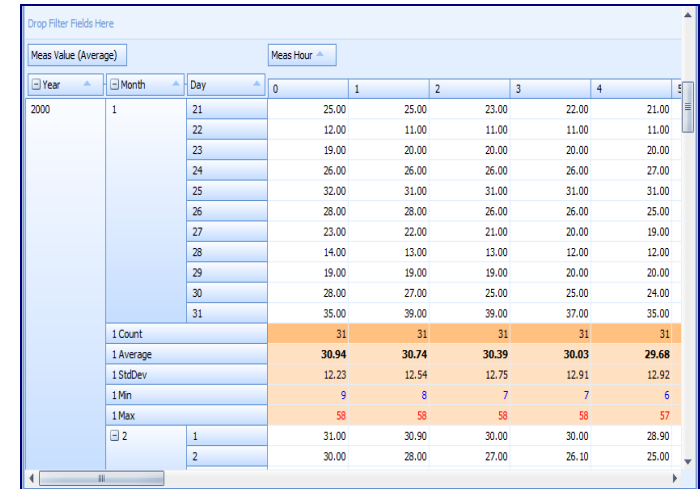


Data and Forecasts

Plot Daily and Hourly Data



Plot and verify forecast



View Pivot Hourly data tables



Gridded Data Integration

SWS provides direct access to several gridded data catalogues supported by Speedwell (subject to subscription). Point data is available for any latitude/longitude within a given catalogue. In addition to point data, users can apply mathematical functions over user-defined areas or standard regions. For example, this could be daily average over a given region or the maximum/minimum of all data points within a chosen area

Gridded Data Services - Region		Speedwell Data Service	Gridded Data Services - Region		Grid
Catalogue					
Data Element Name	Data Provider Name	Earliest Data	Is Hourly	Latest Data	Measure Units
Rain	ARC2	01/01/2015	<input type="checkbox"/>	14/12/2015	mm
Rain	Aus BOM	01/01/1900	<input type="checkbox"/>	15/04/2016	mm
Solar Exposure	Aus BOM	01/01/1990	<input type="checkbox"/>	28/04/2016	MJ/m2
Rain	CHIRPs	01/01/1988	<input type="checkbox"/>	13/02/1988	mm
Mean Wave Direction	ERA 0.75 resolution	01/01/1979	<input checked="" type="checkbox"/>	31/01/2016	degrees
Sea Surface Tempera...	ERA 0.75 resolution	01/01/1979	<input checked="" type="checkbox"/>	31/01/2016	K
Temperature 2m	ERA 0.75 resolution	01/01/1979	<input checked="" type="checkbox"/>	31/01/2016	K
Wave Height and Swell	ERA 0.75 resolution	01/01/1979	<input checked="" type="checkbox"/>	31/01/2016	m
Wind u +10m	ERA 0.75 resolution	01/01/1979	<input checked="" type="checkbox"/>	31/01/2016	m/s
Wind v +10m	ERA 0.75 resolution	01/01/1979	<input checked="" type="checkbox"/>	31/01/2016	m/s

↑
Select gridded data source

Region Definition

Name: Portugal

Description: Portugal rough outline

Is Public: GLID:

Show On Map

Clear Map

POLYGON((-8.47962652071294 41.8612013297247,-8.20386734102544 42.1408724539827,-8.09430405977544 42.043049978139,-8.223999727544 41.928713622414,-8.11607971602544 41.811809855723,-7.8743779272544 41.8960109530633,-7.42393804415044 41.8511096562544,-7.2371704662544 41.8637915297247,-7.382388259094 41.928713622414,-7.06138921602544 41.9613993557071,-6.975846575871 41.9613993557071,-6.9363812540044 41.946505878961,-6.603139466063 41.93888671898,-6.49910013352544 41.650207062903,-6.174966579984 41.5840002908454,-6.35826421602544 41.3622459491397,-6.63292241915044 41.2384421993278,-6.8416626532544 41.0647221400665,-6.948326666044 41.033809339117,-6.8416626532544 40.7024657888368,-6.8196099727544 40.51575299232,-6.767391771134 40.34213480138,-7.0064420119637 40.2131166875137,-6.88809328287401 40.0379925181885,-7.0394165977544 39.717613288275,-7.26668226028794 38.6669381334,-7.1502603178974 39.6626617870187,-7.2701294804044 39.4466605099046,-7.2097046871204 39.1618689912614,-7.1373017847544 39.1021217031002,-7.0366087550949 39.115279052031,-6.915113731838 39.0944037789911,-7.0223756416044 38.8203118192977,-7.259142469485 38.7175220994515,-7.3388918476541 38.4512977883843,-7.06158921602544 38.174951144872,-6.9253573762544 38.223788624969,-7.0009441133794 38.1082691888046,-7.24815679415044 37.872208493904,-7.4850063960237 37.535463137382,-7.3832256366815 37.1420537344134,-7.0195693366815 37.0018013793335,-6.42818718183 37.10701581479464,-8.72355763491815 38.456259205022,-6.0311748241815 38.4614552882583,-6.4020060366815 38.736212444558,-6.168189366815 38.367525271861,-6.9423841874515 40.3022190902509,-6.63566709991815 41.0453075024528,-6.855393741815 41.868860462737,-8.87962652071294 41.8632915297247))

→
Define the area with the cursor tool and Transform data (eg sum / max / min / average) and extract to SWS



How to manage your weather data by doing nothing!

The SWS Data Manager manages weather data and forecasts so well that most SWS clients don't even know it exists.

- New historical data sets that are delivered to the FTP are automatically imported
- Daily/hourly updates of weather data feeds are automatically imported



Seamless Data Management

The screenshot displays the Oasis Data Manager software interface. The main window is titled "Import Filter - Speedwell Weather - Oasis Data Manager". The interface includes a menu bar (Home, Database Management, User Management, Tools) and a toolbar with various icons for data management tasks. The central area is divided into several panes:

- List of Data Providers:** A table listing various data providers with columns for ID, Name, FTP Address, FTP Login, FTP Password, and Local Sa. The "Weather X Change" provider is highlighted.
- Data Provider Dialog:** A modal window for configuring the "Weather X Change" provider. It includes fields for Name, FTP address (ftp.wxch.com), FTP Login, FTP Password, FTP Data Initial Dir, and Local File Saving Path (E:\Data Files\WXC\). It also has checkboxes for "Use Passive FTP File Transfer Mode" and "Forecast Provider?".
- Import Filter Dialog:** A modal window for configuring the import filter for the "Weather X Change" provider. It includes a table for mapping database table names to fields and values, and a section for defining weather elements and other fields.

Table 1: List of Data Providers

ID Data Provider	Name	FTP Address	FTP Login	FTP Password	Local Sa
53	Speedwell ECMWF Seasonal as Data P...				
54	Speedwell ECMWF Seasonal				
95	Speedwell GFS Ens AVG				
96	Speedwell GFS Ens AVG as Data Provi...				
3	SWD				
63	Swedish Met Office				
24	SYNOP & ISH (SYNOP)				
93	Taiwan Met Office Website				
98	TEst Data Provider				
40	Thailand Met Office				
18	Turkish Met Office				
99	Ugandan Met Office				
75	UKMO (Data Provider)				
89	US Geological Survey				
1	Weather X Change	ftp.wxch.com			
14	WSI_Forecast				

Table 2: Import Filter Configuration

Database Table Name	Field	Value
	Town	CITY
	Latitude	LAT
	Longitude	LONG
	Altitude	ALT
	Allow Create Station	FALSE
	Allow Lookup from NOAA...	FALSE
	Allow Update Station Na...	FALSE
	Allow Update Other Stat...	TRUE
	Forecast Provider File F...	0
	Forecast Import Helper ...	2
	Create one ID Ensemble...	TRUE
tblRelativeHumidity	Relative Humidity	12Z_REL_HUM
tblPressureAve	Pressure Ave	12Z_MSLP
tblRain	Rain	DAILY_RAIN
tblSnow	Snow	DAILY_SNOW
tblSunshine	Sunshine	SUNSHINE

Forecast Provider File Format:

- 0: WXC Date Format: DD/MM/YYYY. CSV=','
- 1: AER Date Format: YYYY-MM-DD. CSV=','
- 2: EarthSat/MDAFederal Specific format.
- 3: WSI Date Format: YYYY-MM-DD. CSV=','

Forecast Import Helper Type:

- 1: for WXC and EarthSat Forecast using old import methods
- 2: for WXC and Speedwell forecast format. Station ID is WMO
- 3: for Speedwell forecast where Station ID is the SRCID

Define the data sources
Map the CSV files Headers
That is it – done!



Strict Data Type Management

The screenshot shows the 'Historical Data Viewer' window. The 'Station' is set to 'New York-LaGuardia Airport' and the 'Element' is 'Temperature Min'. The date range is from '01/01/2000' to '01/05/2000'. The '2nd Element' is 'Temperature Max'. The interface includes tabs for 'Detailed Series with Chart Representation', 'See All Data Types', 'Data Comparer', and 'Fast Inventory Summary'. Below the tabs are 'Display' and 'Edit Data' buttons. The main area contains two data tables with columns: 'Dates', 'Synop QC...', 'Climate Q...', 'Climate Cl...', 'Reconstru...', 'Recalibrat...', and 'User's Seri...'. The data is presented in a grid format with alternating row colors.

Dates	Synop QC...	Climate Q...	Climate Cl...	Reconstru...	Recalibrat...	User's Seri...
22/03/2000...	38	38	38	38	35.808744...	37.94
23/03/2000...	38	38	38	38	35.808744...	37.94
24/03/2000...	45	45	45	45	42.808744...	44.96
25/03/2000...	50	50	50	50	47.808744...	50
26/03/2000...	51	51	51	51	48.808744...	48.92
27/03/2000...	43	43	43	43	40.808744...	42.98
28/03/2000...	48	48	48	48	45.808744...	48.92
29/03/2000...	46	46	46	46	43.808744...	46.04
30/03/2000...	44	44	44	44	41.808744...	44.06
31/03/2000...	41	41	41	41	38.808744...	41
01/04/2000...	43	43	43	43	40.808744...	42.98
02/04/2000...	50	50	50	50	47.808744...	50
03/04/2000...	53	53	53	53	50.808744...	53.06
04/04/2000...	49	49	49	49	46.808744...	48.02
05/04/2000...	42	42	42	42	39.808744...	42.08
06/04/2000...	42	42	42	42	39.808744...	42.98
07/04/2000...	51	51	51	51	48.808744...	51.98
08/04/2000...	50	50	50	50	47.808744...	50
09/04/2000...	31	31	31	31	28.808744...	31.1
10/04/2000...	40	40	40	40	37.808744...	41
11/04/2000...	36	36	36	36	33.808744...	35.96
12/04/2000...	41	41	41	41	38.808744...	41

Speedwell Weather uses a standard SWS data base as the backbone of its own data and forecast business with over 140,000 weather stations storing multiple weather elements and multiple data quality types....it scales!



Technical



Back Office Integration

- Integration is possible whether SWS is internally installed in your organisation or hosted by us
- For internal installations, Speedwell have experience of integrating SWS into other existing back office processes
- It is possible to raise email alerts at key stages in the settlement life cycle (eg when a Transaction has been edited). These can be implemented using SQL Server emailing functionalities and triggers or by creating specific Windows Services



SWS Permissions Matrix

Full user permissioning is supported either with standard permissions or configurable permissions

The screenshot displays the SWS Permissions Matrix application interface. It features a search bar on the left with the text 'permission' and a 'Display' button. Below the search bar is a table with columns 'Title', 'Location', and 'Rank'. The search results show 'Group Permissions' in 'Speedwell Weath...' with a rank of '1'. The main content area is divided into three overlapping windows, each showing a 'Permissions Matrix' for a different module: 'Back Office', 'Trading', and 'Data Manager'. Each window contains a table with columns for 'Product', 'Feature Group', and 'Features'. The 'Data Manager' window also includes a 'Features' column with specific permissions like 'Can Start the SWS Data Manager' and 'Can Access the Database Navigator'. The application window title is 'Speedwell Weather System - Help' and the navigation path is 'SWS Oasis Desktop > Reference Information > Permissions >'.



Auditing

SWS Oasis - Event Viewer

Menu View

Close Audit Action System Events General Log DB Upgrade Log Relayed Emails Queued Relayed Emails Delivered

User Audit

Date From 05/August/2017 Date To 11/August/2017

Search Filter

NT User Application User Form Name Action Table Name

Enter text to search... Find Clear

Drag a column header here to group by that column

ID	Program	User	Action	Changes	Changes To	Other									
Audit	Machine	Name	Version	Name	NT User	Name	Date Time	Action Des...	Value Before	Value After	Form	Fo...	Table	Parameters	Info
33712	SPEED...	SWSOasisD...	12.0...	Trial	WEA...	GEN...	10/Aug/2017 ...	Running C...		.xtraTabCont...	FormCreditRiskReports	20...	CreditRisk		List of counterparties: 0,69,75,89,72,66,...
33711	SPEED...	SWSOasisD...	12.0...	Trial	WEA...	GEN...	10/Aug/2017 ...	Running P...	.TabContro...	.TabControlM...	FormPortfolioPLandE...	3d...	PortfolioE...	IDPortfolio=454 - ID...	
33710	SPEED...	SWSOasisD...	12.0...	Trial	WEA...	GEN...	10/Aug/2017 ...	Running P...			FormPortfolioPLandE...	3d...	PortfolioE...	IDPortfolio=452 - ID...	
33709	SPEED...	SWSOasisD...	12.0...	Trial	WEA...	GEN...	09/Aug/2017 ...	Running C...		.xtraTabCont...	FormCreditRiskReports	95...	CreditRisk		List of counterparties: 0,69,75,89,72,66,...
33708	SPEED...	SWSOasisD...	12.0...	Trial	WEA...	GEN...	09/Aug/2017 ...	Running P...	.TabContro...	.TabControlM...	FormPortfolioPLandE...	03...	PortfolioE...	IDPortfolio=454 - ID...	
33707	SPEED...	SWSOasisD...	12.0...	Trial	WEA...	GEN...	09/Aug/2017 ...	Running P...		.TabContro...	FormPortfolioPLandE...	03...	PortfolioE...	IDPortfolio=452 - ID...	
33706	SPEED...	SWSOasisD...	12.0...	Trial	WEA...	GEN...	08/Aug/2017 ...	Running C...		.xtraTabCont...	FormCreditRiskReports	bf...	CreditRisk		List of counterparties: 0,69,75,89,72,66,...
33705	SPEED...	SWSOasisD...	12.0...	Trial	WEA...	GEN...	08/Aug/2017 ...	Running P...			FormPortfolioPLandE...	03...	PortfolioE...	IDPortfolio=454 - ID...	

User Value Before/After Information

Value Before	Value After
Column1	Column2
.TabControlMain.TabHistoricalReports.uC_HistoricalExpiry... -1	.TabControlMain.TabHistoricalReports.uC_HistoricalExpir... -1
.TabControlMain.TabHistoricalReports.uC_HistoricalExpiry... 0	.TabControlMain.TabHistoricalReports.uC_HistoricalExpir... -22442.7212663271
.TabControlMain.TabHistoricalReports.uC_HistoricalExpiry... 0	.TabControlMain.TabHistoricalReports.uC_HistoricalExpir... -21392.5247234999

Allowing the compliance function to monitor changes/actions such as trade entry, creation of new pricing models, changes to valuation models, portfolio outputs, transaction edits....



weatherXchange[®] Integration with SWS

weatherXchange

weatherXchange[®] is an independent platform designed to help companies access index based weather risk protection



Easy weatherXchange RFP Response

Communicating the terms of a weather deal between clients and risk takers has been revolutionised with the integration of Speedwell WeatherML. Once the terms of a deal have been captured using either the weatherXchange website, or another user's SWS, a WeatherML file can be generated and sent to interested counterparties. These counterparties are able to import the WeatherML file directly into SWS and then download the relevant historical data, if required, to price the deal.

```
<?xml version="1.0" encoding="utf-16"?>
<CSWSPricingRequest xmlns:kwd="http://www.w3.org/2001/XMLSchema" xmlns:kxi="http://www.
  <ID>451bb5-f125-487a-9d3f-7b72e3eece93</ID>
  <SystemID>SWSDESKTOP</SystemID>
  <WebAppID>
  <IsFirmPrice>false</IsFirmPrice>
  <IsLong>true</IsLong>
  <Cashflow0>Cashflow
  <IsCalculateGreeks>false</IsCalculateGreeks>
  <ValueAtRiskLevel />
  <SummaryStatYears />
  <PricingDate>2015-12-04T00:00:00+00:00</PricingDate>
  <WeatherDerivative kxi:type="CSWSWeatherDerivative">
  <SWSIDOptions>390</SWSIDOptions>
  <CalculationPeriodFirstDate>2015-12-01T00:00:00</CalculationPeriodFirstDate>
  <CalculationPeriodLastDate>2015-12-31T00:00:00</CalculationPeriodLastDate>
  <StripQuantity1</StripQuantity>
  <WeatherIndexClassName>Speedwell.WeatherML.Classes.CSWSWeatherIndex</WeatherIndexCl
  <WeatherIndex>
  <SWSIDIndex>382</SWSIDIndex>
  <IDIndexType>0</IDIndexType>
  <IndexType>C_IndexHDD</IndexType>
  <Location>
  <SWSStnID>888</SWSStnID>
  <SpeedwellExternalID>46920</SpeedwellExternalID>
  <Name>PRAGUE ROZYNE</Name>
  <Country>
  <IDCountry>64</IDCountry>
  <CountryName>Czech Republic</CountryName>
  </Country>
  <IsCMEStation>false</IsCMEStation>
  <COOPID kxi:nil="true" />
  <Latitude>50.099</Latitude>
  <Longitude>14.28</Longitude>
  <Altitude>365</Altitude>
  <ICAO>LKPR</ICAO>
  <WDAV kxi:nil="true" />
  <SMC>11518</SMC>
```

Speedwell WeatherML based term sheet from weatherXchange Platform

Summary of weather structure derived from Speedwell WeatherML

Click to save structure in SWS for easy pricing

Please enter the weatherXchange RFP file path:
C:\Temp\hr2.WML

Preview Import

RFP Specification

Company Requesting RFP: Speedwell Weather Derivatives Ltd

The counterparty would like to: Counterparty would like to BUY

Counterparty Message

Derivative High Level Detail Summary:

Station Name: LONDON HEATHROW
Station Code: 708
Element: Temp Ave
Index Type: HDD Like
Period Start Date: 01/04/2016 00:00:00
Period End Date: 30/04/2016 00:00:00
Derivative Type: Call (capped)
Strike: 1,000.00

Automatically Retrieve All Pricing Data Open Pricer



Automated Pricing Service (APS)

SWS v12 includes a pricing service to fully automated the process of responding to RFPs coming from the weatherXchange[®] platform. It can be configured to filter pricing requests on a number of criteria and uses dedicated user-defined index models to generate a price.

The APS is a web service and is fully integrated with the Speedwell Weather System API and Speedwell SuperPack[®] database.

The APS can be hosted by Speedwell or installed within your organization. It is available for no additional licence charge to companies that subscribe to both SWS Enterprise and Speedwell's SuperPack[®] -Premium service



Automated Pricing Service (APS)

The screenshot shows the 'Trading Stations' configuration window. At the top, there is a navigation bar with icons for Home, View, Trading Stations, Element Mapping, Index Models, Compound Indices Models, Pricing Conditions, Requests Table, Returned Price Table, and User Activity Records. Below this is a tabbed interface with 'Element Mapping', 'Element and Index Models Links', and 'Trading Stations' selected. A message states: "The Automated Pricing Service will only accept pricing requests for the weather stations listed in this grid. The Proxy station is the station of reference for monthly CAT adjustment." Below the message is a table with columns: ID, Main Station, Element, Main ID Station, Main WMO, Main WBAN, CME Adj Lin..., CME Station, CME WMO, and CME WBAN. The table lists several stations, including Essen, London Heathrow, and Paris Only. An 'Edit Trading Station' dialog box is open, showing a dropdown for 'Weather Station' set to 'London Heathrow' and a section for 'Reference Station For Data Pricing Adjustment using monthly CAT values' with a note to 'Please select the reference station'. Below this are buttons for 'TMin TMax TAve', 'TMin TMax TAve Rain', 'Rain', and 'Snow'. A list of weather elements is shown with checkboxes, including Snow Depth On Ground, Sunshine, Wind Ave, Wind Max Gust, Wind Max, Temperature Ave, Temperature Max, Temperature Min, Rain, Cloud Cover, Humidity Ave, Humidity Max, Humidity Min, Temp. Wind Chill Adj., Waves Ave, Waves Max, Pressure Ave, Pressure Max, Pressure Min, River Flow, Visibility, and Carbon Dioxide.

The screenshot shows the 'RPS System Settings' configuration window. It has a similar navigation bar to the 'Trading Stations' window. Below the navigation bar is a tabbed interface with 'Element Mapping', 'Element and Index Models Links', 'Trading Stations', and 'RPS System Settings' selected. A dialog box is open with the title 'Conditions under which a price shall not be calculated or displayed'. It contains several settings: 'Minimum number of days the contract can start from today (prevent users using forecast to gain advantage)' with a dropdown set to 1; 'Max Duration of the risk period in Days' with a dropdown set to 366; 'Min Payout Limit (USD)' with a dropdown set to 0; and 'Max Payout Limit (USD)' with a dropdown set to 100,000,000.



Does your weather system do this?



Does your weather system do this? - Part 1

- Does your weather system handle hourly data?.. strips? ..compounds?.. multi period deals?..multi triggers? ..baskets ..gas quantos?
- When pricing a transaction can you exclude days of the week and specific dates?
- Does it support ultra-exotic deals through a "back door" with those deals still being fully incorporated in portfolio calculations?
- Can you create a structure that handles risk on specific non-consecutive hourly periods in a day?
- Do you handle leap year adjustments robustly? - we offer six different methodologies
- Can your middle office users stress test a portfolio by overriding the front office valuation models with one of their own choice?
- Can you price a weather hedge using INDIVIDUAL members of an ensemble forecast to capture the implicit convexity?
- Does your weather database respect the different data qualities that are used and which may be dramatically different even at the same weather station?



Does your weather system do this? - Part 2

- Would your audit trail breakdown if a weather data point already used in settling a transaction is later revised by a national met service and subsequently updated after settlement of a weather hedge?
- Can you detrend the underlying weather data AND the final index?
- Does your detrending method respect the differing trends seen in different months of the year?
- Does your system automate the raising of trade confirmations and invoices?
- Do you have a permissioning structure that prevents, for example, accidental deletion of booked trades by front office users or un-authorized changes to front office models by back office users?
- Does your system provide credit risk reports?
- Can you easily export weather data and historical forecasts for use in external applications ?
- Can you run a weather hedge valuation or a retrospective portfolio valuation using only the information that was available at that time?



Does your weather system do this? - Part 3

- Can you retrieve a snapshot of the weather data that was used to settle a transaction before and QC revisions to that data?
- Does your weather database respect the various different types of weather data on which a transaction can be priced?
- Can your database support non-weather variables including energy or commodity prices?
- Does your weather database scale to tens of thousands of weather sites and handle daily, hourly and sub hourly ..down to minutes?
- Does your system support daily VaR calculations at the portfolio level?
- Does your system support full regulatory reporting?
- Does your system allow a hybrid actuarial / market approach by allowing means and vols to be over-ridden?
- Does your weather pricing system support Speedwell weatherML for the purpose of sending and receiving weatherXchange RFQs?
- Does your system offer the option of providing configurable, fully automated responses to RFPs?



More information

Additional documentation is available on our documents web page here:
<http://www.speedwellweather.com/Pages/Others/Document.aspx>

Weather Risk Trading Software, SWS	
An Overview of Speedwell Weather System	
SWS Features Summary List	
SWS Version 12.0 What's New Jul 2017	
SWS Version 11.5 What's New Feb 2017	
SWS Version 11 What's New May 2016	
SWS Back Office Process Flow	
SWS Weather Data Format	
SWS Forecast Format	
SWS Index Model	
SWS Forecast Model	<i>On Request</i>
SWS Pricing Methods Used	<i>On Request</i>
SWS Supporting Complex Deals	<i>On Request</i>
SWS FAQs	
SWS Technical Requirements	
SWS Hosted	
SWS User Help Document(CHM)	<i>On Request</i>
SWS Installation Guide	<i>On Request</i>
SWS Application Support: Configuring SWS Users	<i>On Request</i>

T: +44 (0) 1582 465 551
E: SWSales@speedwellweather.com
Harpenden, UK | Charleston, SC, USA

www.speedwellweather.com

Speedwell
Weather

