Tungsten Sabre User Guide

The Lodestar GUI is the main interface to interact with the Tungsten risk system, and it gives the user quick access to all the risk data that is feeding the Tradar PMA risk reports. It is also an excellent platform to quickly schedule and run risk reports to daily keep track of your funds risks.

This document explains how to best use the system.

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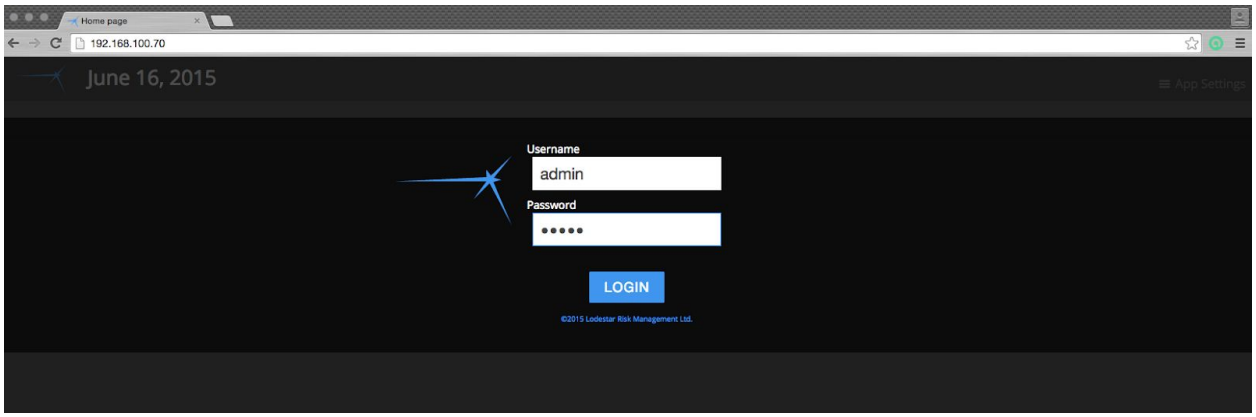
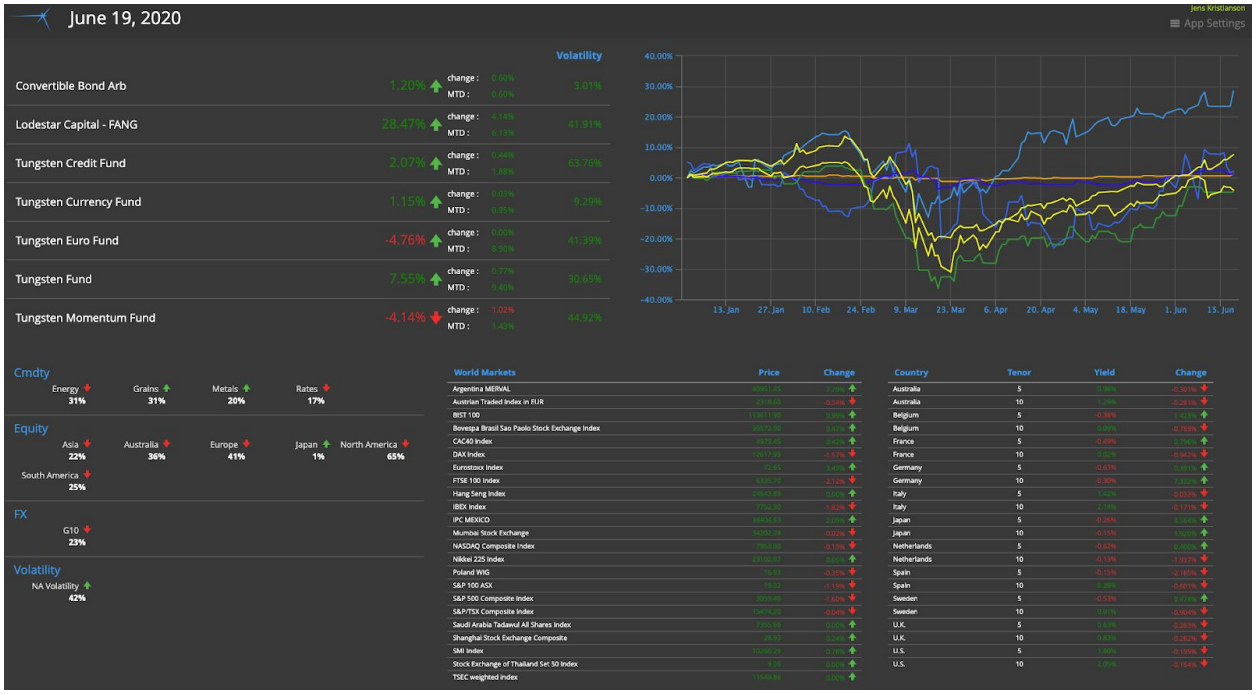
1.0 Logon Screen

To be able to access the Tungsten GUI you need a valid username and password. By default Tungsten is configured with an admin user that you use to set up new users. Contact your Lodestar or Eze representative for assistance in setting up new users. You can have as many users as you need - each user can be configured to access all or only certain parts of the system.



1.1. Main Screen

Once logged on to the system you are presented by the main information screen.



1.1.1 Fund performance grid

The main screen shows a Year To Date summary as well as the Month To Date performance and change since the previous day across all the funds that have positions. In addition to the fund performance the system also shows the realized volatility using year to date daily returns.

1.1.2 Charts

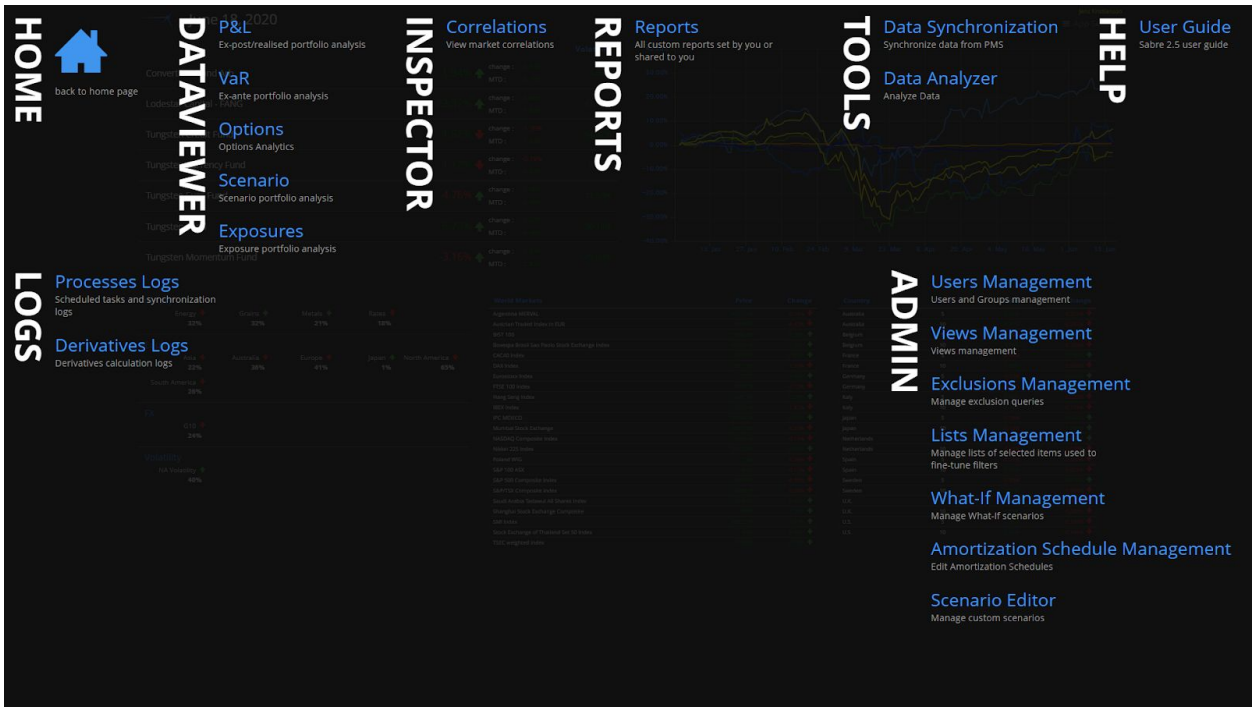
The chart shows the year to date performance for all funds in your system The ratio return is using daily P&L over the daily Net Asset Value.

1.1.3 Market Risk Summary

In the lower part of the screen there is a market risk summary calculated using the Lodestar market data service (data is calculated on Lodestar servers and the aggregated data is loaded by the client database). The percentage represents the risk (volatility measured using a rolling window of 30 days historical returns) of that particular market. In some cases such as equities the risk is an average across several indexes. The arrow is a forecast on where volatility is heading. Lastly the color code (green to red) indicates the "risk utilization" - which simply is, where on the risk scale are we now versus the past ten years? Let's say the US equity market risk range is between 15% and 80% volatility. A current volatility/risk of say 18% would mean we are in the lower range, or approximately at 20% above the lower part of the range.

2.0. Main Menu

The main menu can be accessed from the upper left corner by clicking on the blue star.



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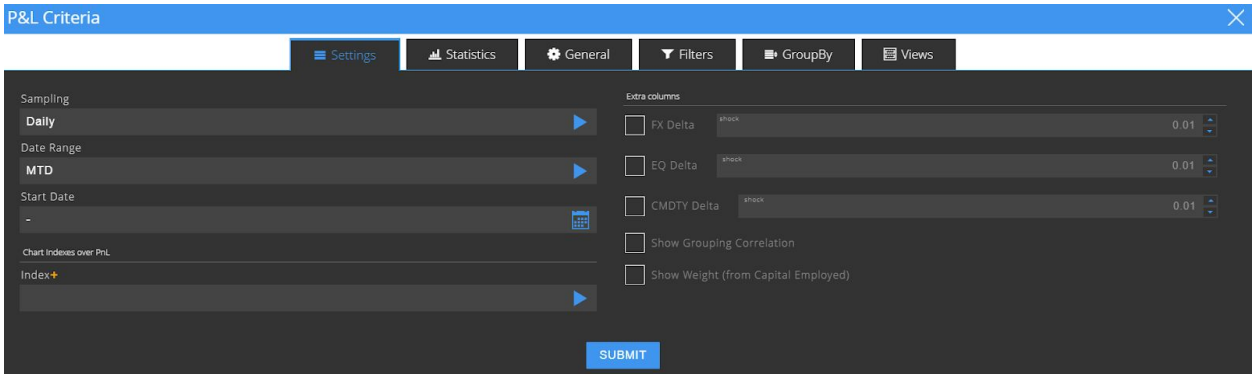
The menu is split up into eight sections - Home, Data Viewers, Inspector, Reports, Tools, Help, Logs and Admin. Your main area of interest on a day to day basis will be the Data Viewers, Reports and Tools sections.

3.0 Data Viewers

3.1 P&L - Profit and Loss

The initial display when the Profit and Loss view opens is the latest calculated month to date (MTD) P&L for each fund in the system. The chart shows the month to date performance. The change is the change since the previous period (by default set to daily, which means change from previous business day).

To set up filters and criteria and select what additional data to see - go to the Data Settings in the upper right corner.



You will be presented with the first tab - Settings. On this tab you select the ‘date range’ you wish to use for the P&L. Alternatively you can use a fixed start date in the date combo box below. On the right hand side you have three data columns to add: FX Delta - this calculates the currency delta by shocking all currencies in your portfolio by the shock amount (default +1%). All currencies are all currencies that are not the system base currency.

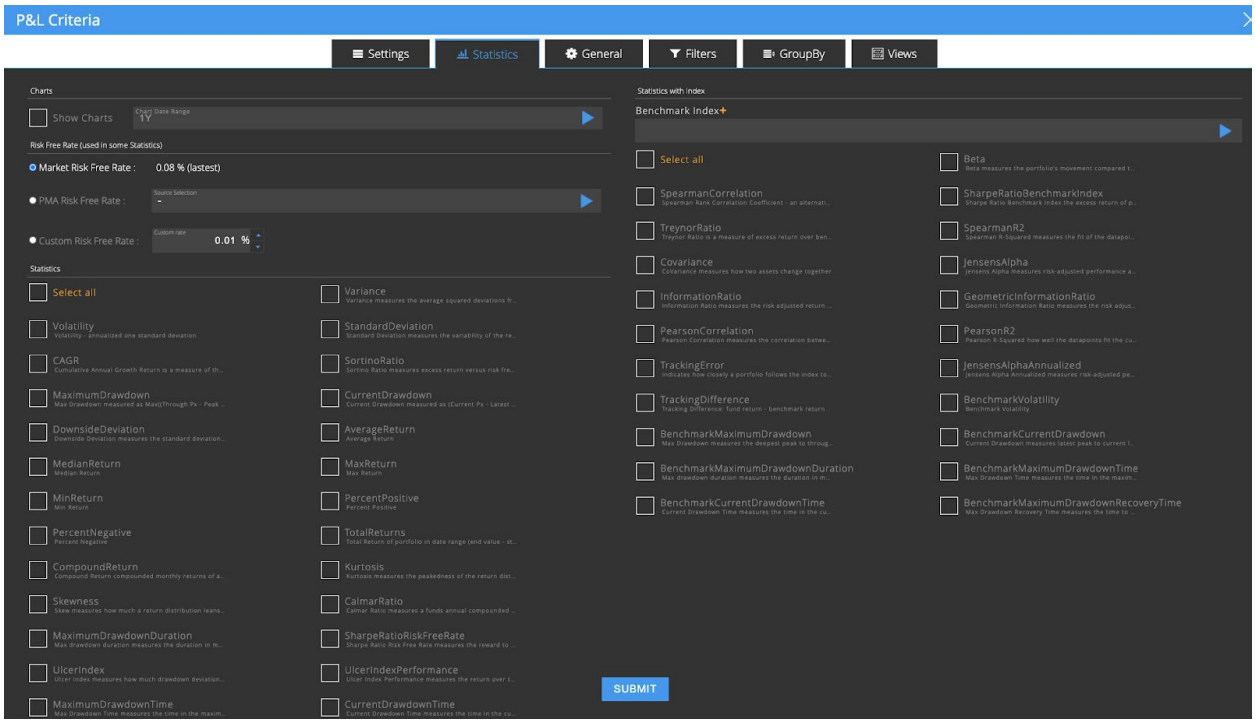
Equity Delta shocks all equity positions by the shock amount (default +1%). Lastly the Show Grouping Correlation will calculate the correlation between your portfolio groupings (more on groupings in the

Group By settings). Say you wish to group by strategy, the grouping correlation will show the correlation between each strategy and the total portfolio return.

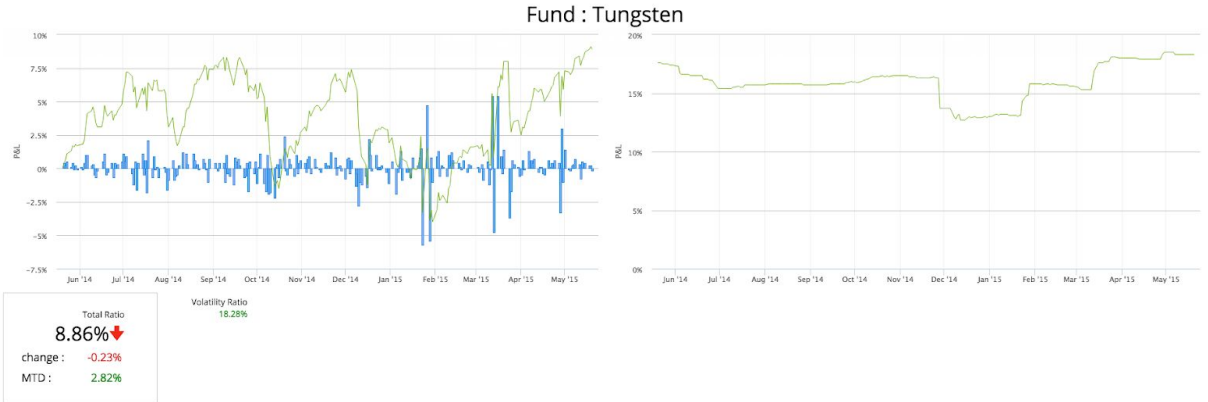
On the Settings tab you can also pick to show the weight of the grouping/position. Lastly you can plot the P&L return series against an Index (or several) using the Index drop down.

3.1.1 Statistics

On the statistics tab you select the statistics you wish to apply to your P&L stream. The statistics that are not calculated against a benchmark are on the left side and the ones that are calculated against a benchmark are selected on the right side. You can pick one or several benchmarks by clicking on the little orange plus button by the benchmark index drop down box.



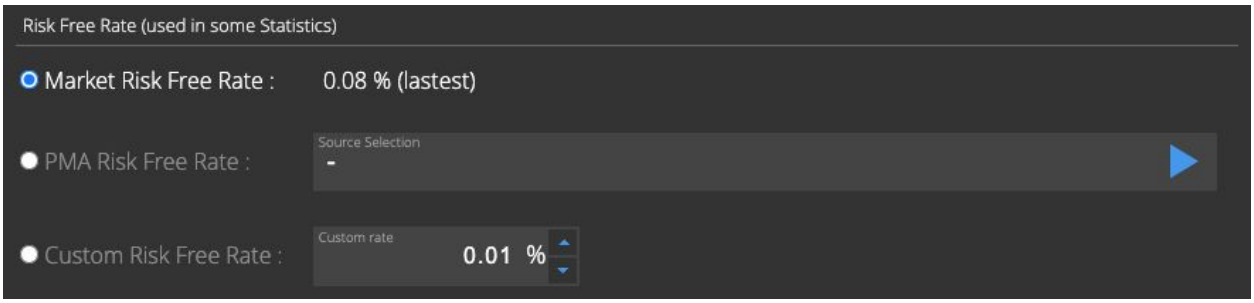
In addition to this - it is possible to plot the selected statistics across the P&L date range. Let's assume we select a year to date date range for the P&L, and select the Chart range to 1Y - each day YTD we will calculate the statistics using one year (1Y) of realized P&L returns and then plotted.



The above example has created the chart for the 1Y P&L performance and the rolling volatility of this range using 1Y of P&L streams for each data point. 8.86% is the total P&L for the 1Y range.

3.1.2 Risk Free Rate

Several of the statistics require a risk free rate to be supplied. There are three ways to supply the risk free rate - the quickest way is to simply use the built in 1M rate supplied by the system. This rate changes as the market updates. The second option is to use a rate supplied in PMA. This can be done by setting up a

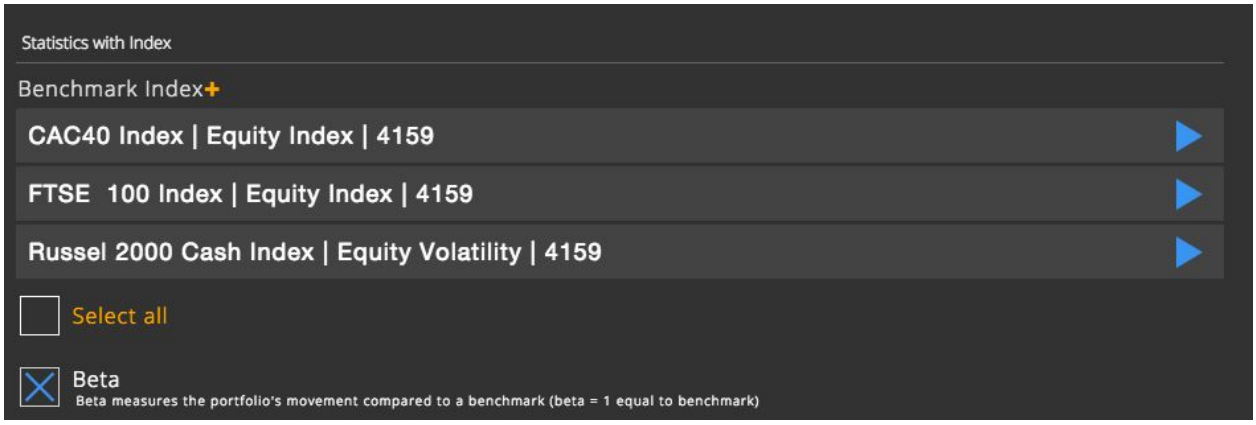


Benchmark Yield Index (PMA secType 636) and then loading that index with a rate (in BenchmarkYieldHist table). Once done Tungsten will use the latest rate defined near or at the risk date as a risk free rate. Lastly the risk free rate can be overridden manually by simply selecting the custom risk free rate and setting the value as you wish.

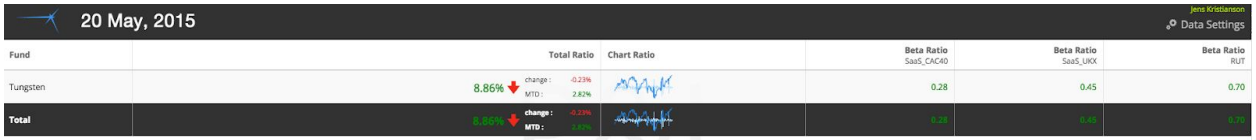
The statistics that can be calculated on the portfolio are described below:

Statistic	Description
variance	Variance measures the average squared deviations from the mean
beta	Beta measures the portfolio's movement compared to a benchmark (beta = 1 equal to benchmark)
volatility	Volatility is a measure of annualized one standard deviation
spearman correlation	Spearman rank correlation coefficient - an alternative to pearson correlation
stDev	Standard deviation measures the variability of the returns of an asset
CAGR	Cumulative Annual Growth Return - CAGR - is a measure of the annual growth rate of a portfolio
sharpeBenchIndx	Sharpe ratio benchmark index the excess return of portfolio versus a benchmark as ratio of risk
sortino	Sortino ratio measures excess return versus risk free rate as ratio of downside deviation
treynor	Treynor ratio is a measure of excess return over benchmark beta
maxDD	Max drawdown measures the deepest peak to trough in the date range
currDD	Current drawdown measures latest peak to current level in the date range
spearman R2	Spearman R-Squared measures the fit of the data points
covar	CoVariance measures how two assets change together
downDev	Downside deviation measures the standard deviation of negative returns
avgRtrn	Average return
medianRtrn	Median return
maxRtrn	Max daily return
minRtrn	Min daily return
pctPos	Percent days positive returns
pctNeg	Percent days negative returns
totalRtrn	Total return of portfolio in date range (end value - start value) / start value
compoundRtrn	Compound return compounded returns of a portfolio (dependent on sampling)
kurtosis	Kurtosis measures the peakedness of the return distribution
skew	Skew measures how much a return distribution leans to one side of the mean
calmar	Calmar ratio measures a fund's annual compounded return as ratio of max drawdown
maxDDDuration	Max drawdown duration measures the duration in months for the longest period of a drawdown
alpha	Jensen's Alpha measures risk-adjusted performance against a benchmark
IR	Information ratio measures the risk adjusted return using arithmetic average
GIR	Geometric Information Ratio measures the risk adjusted return using geometric average
pearsonCorr	Pearson Correlation measures the correlation between an asset and a benchmark
pearsonR2	Pearson R-Squared how well the data points fit the curve
sharpeRFR	Sharpe Ratio Risk Free Rate measures the reward to risk ratio against the risk free rate
ulcerIdx	Ulcer Index measures how much drawdown deviation of a specific date range
ulcerIdxPerf	Ulcer Index Performance measures the return over the ulcer index
maxDDTime	Max drawdown time measures the time in maximum drawdown
currDDTime	Current drawdown time measures the time in the current drawdown
maxDDRecoverTime	Max drawdown recovery time measures the time to recover from max drawdown (through to peak). Expressed in months
modifiedSharpe	Modified Sharpe Ratio measures the return over modified Value At Risk using a Cornish Fisher expansion utilizing the skew and kurtosis of the realized portfolio volatility.

On the statistics using a benchmark it is possible to select several benchmarks to calculate against at the same time. Click the + sign to add another row for the index selection.

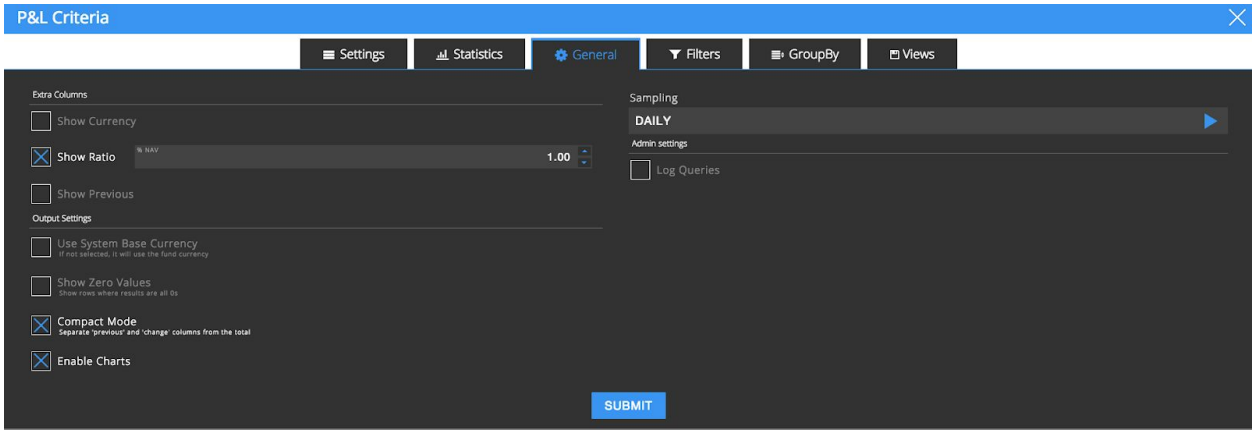


The above example produces the below result.



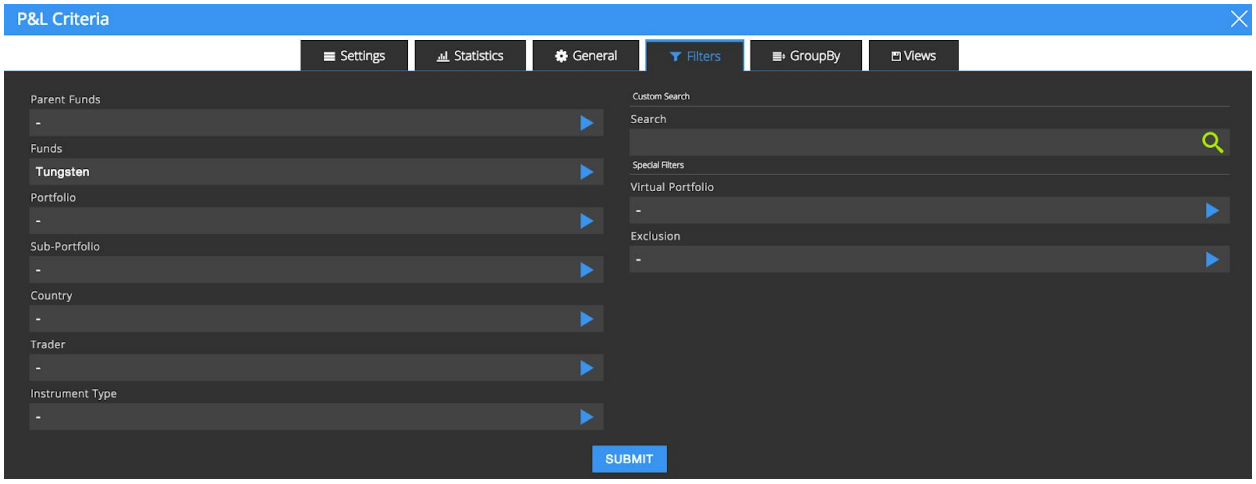
3.1.2 General Settings

In the general tab we have selections for how to display the P&L results, either in the fund currency or as a ratio over the NAV. It is also possible to adjust the NAV using the ratio % of NAV. By default this is set to 1, however if you set it to 0.50 it will use 50% of your NAV as ratio.

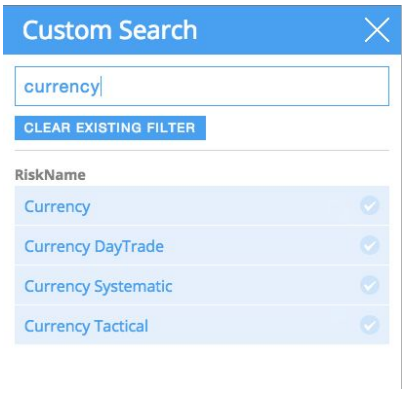


The sampling allows us to use daily, weekly or monthly returns from our P&L series.

3.1.3 Filters



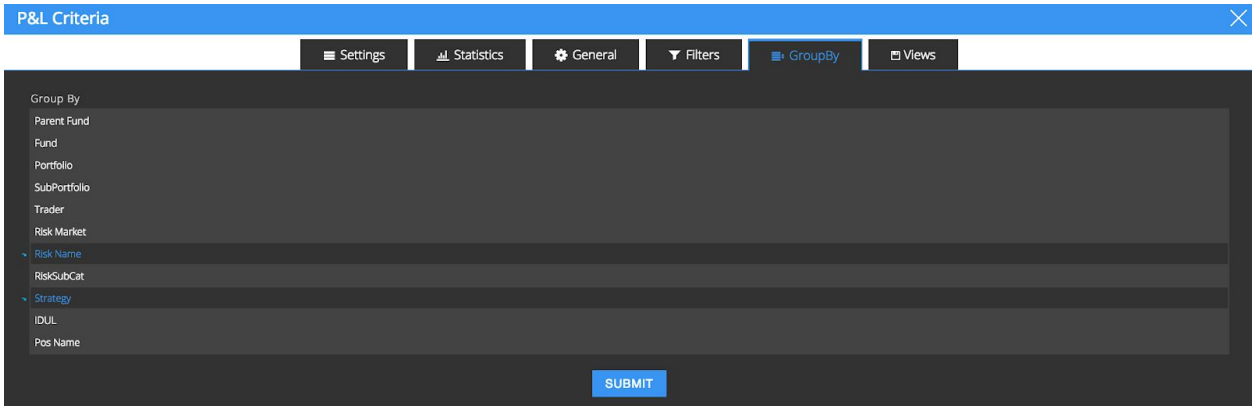
The filters section allows us to apply filters on our portfolio, such as fund. On the right hand side, we have



a search function. Simply type into the field and the system will search through your portfolio using specific attributes such as strategy name, riskname, and riskSubcat. In the above case we typed currency and the system could find four different riskNames with the word currency. Select any of these to add it as a filter. An alternative way to filter is to use the Virtual Portfolio filter. These are filters from the old system, so users who have set up a lot of virtual portfolio filters should find them in the drop down box.

The exclusions filter is also from the old system, and users who have setup exclusions will find those in the exclusions drop down.

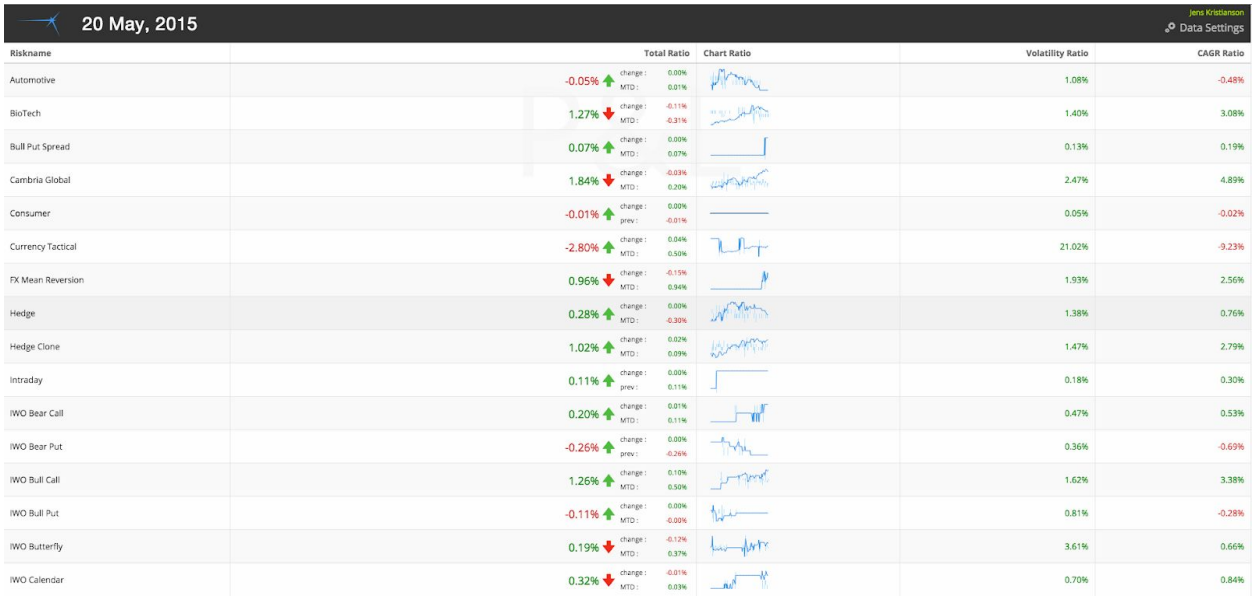
3.1.4 GroupBy



The group by tab allows us to decide how we wish to drill down into our portfolio. Several levels can be selected. In the above case we have selected to view our portfolio by riskName first and then drill down to strategy level.

The below example shows the portfolio filtered by riskName (strategies can be grouped into risk names), and then drilled down to strategy level. The drill down is done by double clicking on the row you wish to drill down to.

Note: The last level is position level (even if not specified in the drill down hierarchy). A quick way to see all positions in a fund, would be use Fund level in the GroupBy, and then double click on the Fund to drill down to position level details.



Riskname	Total Ratio	Chart Ratio	Volatility Ratio	CAGR Ratio
Automotive	-0.05% change : 0.00% MTD : 0.01%		1.08%	-0.48%
BioTech	1.27% change : -0.11% MTD : -0.31%		1.40%	3.08%
Bull Put Spread	0.07% change : 0.00% MTD : 0.07%		0.13%	0.19%
Cambria Global	1.84% change : -0.03% MTD : 0.20%		2.47%	4.89%
Consumer	-0.01% change : 0.00% prev : -0.01%		0.05%	-0.02%
Currency Tactical	-2.80% change : 0.04% MTD : 0.50%		21.02%	-9.23%
FX Mean Reversion	0.96% change : -0.15% MTD : 0.94%		1.93%	2.56%
Hedge	0.28% change : 0.00% MTD : -0.30%		1.38%	0.76%
Hedge Clone	1.02% change : 0.02% MTD : 0.09%		1.47%	2.79%
Intraday	0.11% change : 0.00% prev : 0.11%		0.18%	0.30%
IWO Bear Call	0.20% change : 0.01% MTD : 0.11%		0.47%	0.53%
IWO Bear Put	-0.26% change : 0.00% prev : -0.26%		0.36%	-0.69%
IWO Bull Call	1.26% change : 0.10% MTD : 0.50%		1.62%	3.38%
IWO Bull Put	-0.11% change : 0.00% MTD : -0.00%		0.81%	-0.28%
IWO Butterfly	0.19% change : -0.12% MTD : 0.37%		3.61%	0.66%
IWO Calendar	0.32% change : -0.01% MTD : 0.03%		0.70%	0.84%

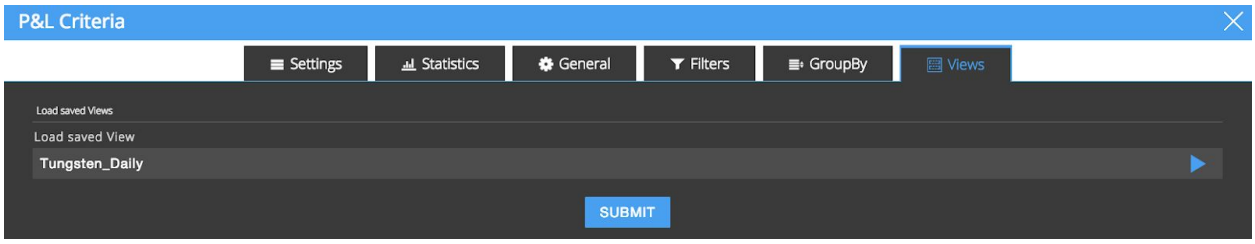
This illustrates the drill down into riskName = Currency Tactical that is then grouped by strategy level.

Strat	Total Ratio	Chart Ratio	Volatility Ratio	CAGR Ratio
AUD.JPY	0.13% change : 0.00% MTD : 0.00%		9.65%	-0.12%
AUD.USD	1.03% change : 0.00% prev : 1.03%		16.49%	1.33%
EUR.CHF	-7.83% change : 0.00% prev : -7.83%		13.01%	-19.40%
EUR.GBP	-0.17% change : 0.00% prev : -0.17%		0.27%	-0.44%
EUR.USD	1.39% change : 0.00% MTD : -0.08%		2.54%	3.70%
FXE	0.07% change : 0.04% MTD : 0.16%		0.63%	0.18%
GBP.USD	0.14% change : 0.00% MTD : 0.11%		0.19%	0.38%
NZD.USD	-0.03% change : 0.00% prev : -0.03%		0.05%	-0.08%
USD.CHF	1.03% change : 0.00% prev : 1.03%		1.64%	2.75%
USD.JPY	1.43% change : -0.01% MTD : 0.31%		1.10%	3.84%
USD.MXN	0.00% change : 0.00% prev : 0.00%		0.00%	0.00%
USD.NOK	0.00% change : 0.00% prev : 0.00%		0.00%	0.00%
USD.SGD	0.00% change : 0.00% prev : 0.00%		0.00%	0.00%
Total	-2.80% **change :** 0.04% **MTD :** 0.50%		21.02%	-9.23%

These groupings and drill downs are available in all the various data views (P&L, VAR, Scenario, and Option analytics).

3.1.5 Views Tab

The final tab is the "Views" tab. This tab allows us to load the settings of our data views for easy



retrieval. The saved views are also used by the reporting engine as we shall see later.

Simply select among one of the saved views on the right hand side drop down selector. Views are saved by user id in the system.

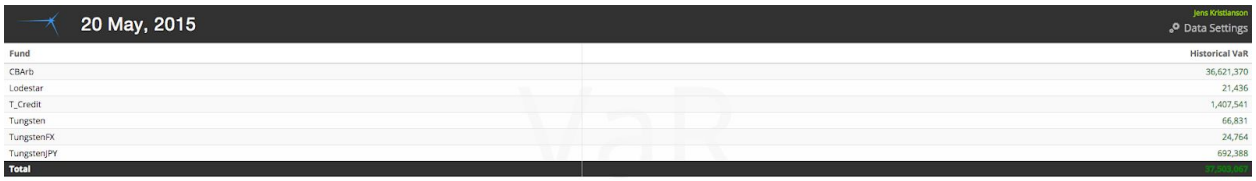
3.1.5 Saving Views

At the bottom of each view, there are three icons in orange.

To save your current view, click the orange "disk" icon. The "mail" icon will email the current result to your mailbox. Please ensure you have SMTP settings set up correctly (initial config on http://localhost:11235 on the server where Tungsten service is running). Lastly, you can export the current view to a Comma Separated file, that you can import to Excel.

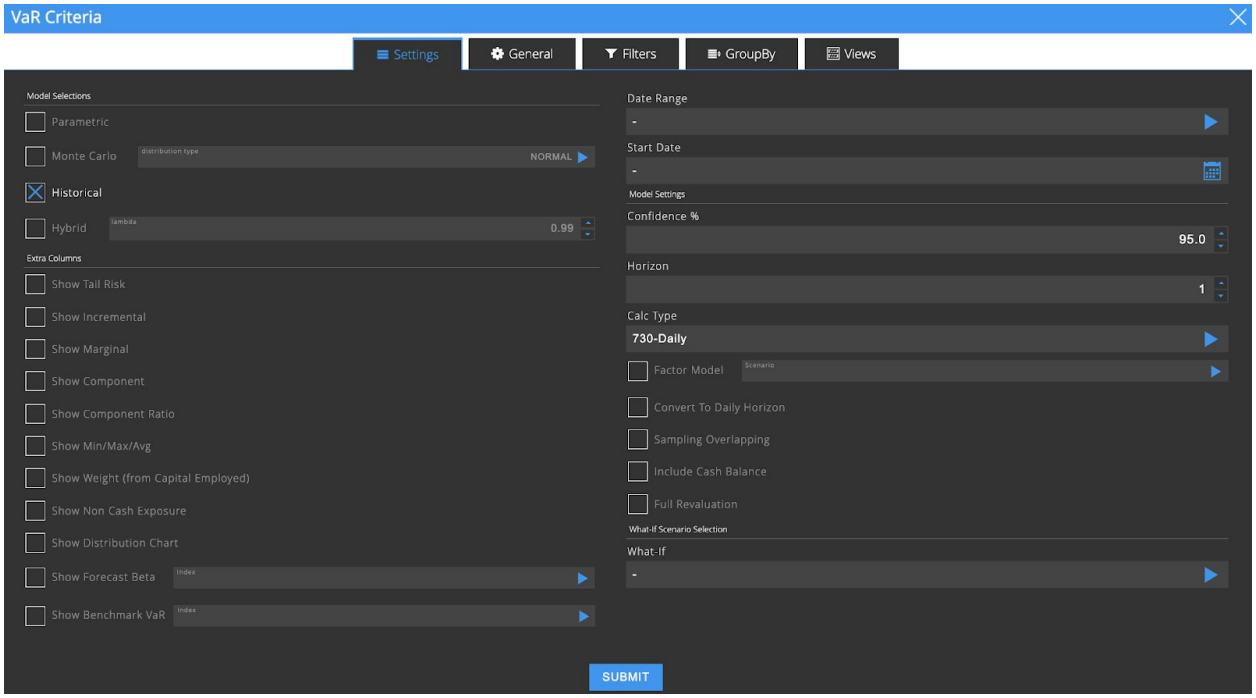
3.2. VaR - Value At Risk

The value at risk data view allows us to calculate a risk forecast for our portfolio.



3.2.1 Settings

As with the P&L view, you use Data Settings to filter for funds and configure your VaR model settings.



In the settings tab we can choose which type of VaR model to use (Parametric, Monte Carlo, Historical or Hybrid).

The Monte Carlo model allows us to use different types of distributions, Gaussian (normal) or a student-T distribution. The default setting is normal.

The Hybrid model is a historical simulation with a twist. We can specify to decay our returns meaning we will put a higher weight on more recent returns. This is done by configuring the The lambda, and by default this is set to 0.99. Lowering the lamda we add more weight to more recent returns.

Note, this decay is different from the decay that is selected when you set up your calcTypes.

On the right hand side of the Settings configuration menu we have the Date Range - the Date Range should only be used if you want to check the VaR model against the actual P&L returns (back test the accuracy). Example, selecting a YTD date range will generate a VaR estimate for each trading day - year to date - this is then compared to the actual portfolio return T+1. If you have a large portfolio this can take significant resources.

As with the P&L data viewer, it is also possible to select a Start Date instead of the date range.

The calcType settings will tell the VaR model what type of data to use - in our example above we have set up a calctype called 1460-Daily. This is using 1460 calendar days of daily returns as input.

Incremental VaR

Incremental VaR is defined as the change of VaR of the portfolio if a specific risk bucket were to be removed. This is calculated by removing the set of positions constituting the bucket (strategy/grouping) and then re-calculating VaR. The difference with and without the bucket is calculated and reported as the Incremental VaR (Total portfolio VAR of all positions) - (Total portfolio VAR without position).
With the Incremental VaR we can see what risk buckets (strategies) are adding to the total VAR or reducing (such as portfolio hedges).

Component VaR

Component VaR is similar to Incremental VaR in that it gives us an idea on what positions.risk buckets are risk reducing vs risk adding. The difference with component VaR vs Incremental VaR (other than the way it is calculated) is that the aggregate is additive and equals the total VaR. This allows us to calculate the Component VaR Ratio (Component VaR / Total VaR). The fact that component VaR is additive is one of the main benefits of this calculation method. Note: Component VaR is estimated using a kernel density estimator function which works well on most linear portfolio's. Component VaR on portfolios

with a large exposure to positions with optionality are less accurate and we advise using Incremental VaR instead.

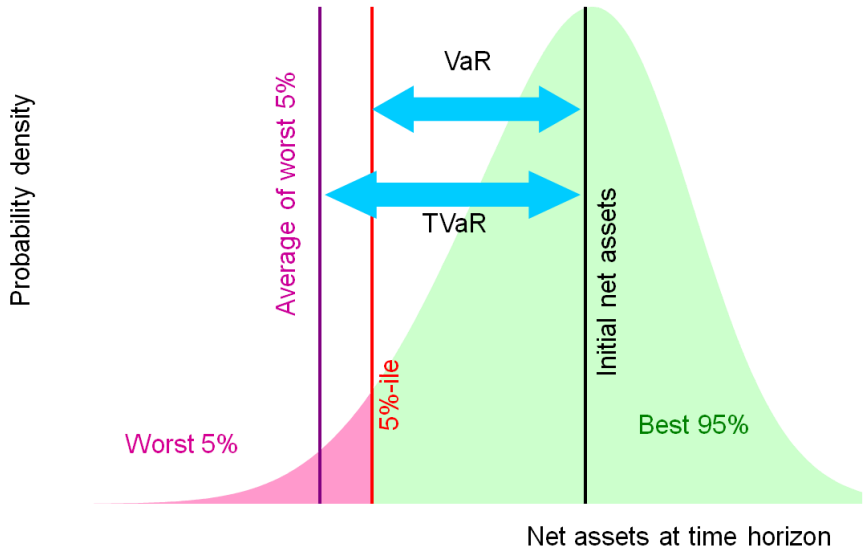
Marginal VaR

The Marginal VaR estimates the change in VaR given a small change in position - in this case 1% change. The Marginal VaR gives us an idea on what parts of the portfolio are more sensitive to position changes. A positive change means the position/risk bucket is adding to the overall risk of the portfolio.

Expected Shortfall

Tail risk or expected shortfall is calculated using the asset distribution result of a historical simulation or a Monte Carlo simulation (standard and hybrid, more about those models in the sections below). The tail risk is then the average loss in the tail at the specific percentile, e.g. 5%.

Expected shortfall (tail risk) is best illustrated with the below graph:



Forecast Beta

Another useful metric available in the Tungsten VaR view is the forecast beta. The forecast beta can be calculated versus a benchmark index of any of the default indexes available in Tungsten. The indexes can also be augmented with time series data imported from PMA.

Forecast beta is estimated simply by taking the covariance of the current portfolio vs the benchmark index and dividing it by the variance of the index using. This is different from the realized beta that is available in the P&L View and it can be useful to compare the two. Obviously the result will be highly dependent on how frequently the portfolio is turned over as the realized beta measures the actual P&L time series vs the benchmark index through time, so adjustments to positions will affect the realized beta. The forecast beta assumes a static portfolio without any adjustments to positions.

The forecast beta can also give us an idea on what parts of the portfolio are risk reducing (negative beta) vs risk adding (positive beta).

Show Weight

The show weight option allows us to show the weight of the risk bucket (position) against all other buckets / positions. The total weight equals 100%. This is a simple yet effective way to see what positions are the largest in the portfolio without considering the volatility. Note: this includes all positions and cash balances.

Show Non Cash Exposure

The show non cash exposure is similar to the Show weight, however we are excluding all cash exposures.

Benchmark VAR

The benchmark VAR shows us the Value At Risk for a selected benchmark, and this can be a useful metric to compare versus your fund VaR.

Distribution Chart

With the show distribution charts picked you can show the return distribution of the simulation VAR models (Monte Carlo, Historical and Hybrid). This can be useful to see if there are any tail spikes in the data.

The “Include cash balance” will include all foreign exchange cash balances (and trading positions) to the VaR estimate. This is all cash balances that are not the system base currency.

The rest of the tabs are identical to the P&L view so we will not cover them here.

CalcType, Horizon, Sampling

The calcType is one of the most important inputs to the various VaR models. It will tell the VaR models how much data to use, what decay to use (if any), what time period the data is extracted from, e.g. GFC 2008/2009 - The resulting variance and covariance matrix of the risk factors is highly dependent on the amount of data and the time period this data is coming from.

The horizon tells us the time into the future the VaR forecast is estimating - if we use daily sampling (730-Daily for example), the portfolio is not expected to have **daily** loss exceeding the VaR number. If we use 730-Weekly, the VaR number is now estimating the **weekly** loss instead, and finally 730-Monthly estimates a **monthly** horizon. It is also possible to use say a weekly sampling (e.g. 1460-weekly) and convert the weekly number to a daily estimate. The VaR models will then run the VaR calculations as usual and then convert the final result to daily. This can be useful in case you want less volatile market data input such as weekly returns, but you want to be able to back test this VaR estimate using the daily P&L returns. If the user wants to see a longer term horizon such as a year you can use any of the samplings (daily/weekly/monthly), however the horizon needs to be set according to the sampling type. If daily is used, a 250 day horizon needs to be used for a one year horizon. If weekly is used, a 52 week horizon should be used, and finally with monthly sampling a 12 month horizon should be set. The VaR result is then converted to yearly by taking the VAR amount * sqrt(250) when using the daily sampling.

To boost the number of data points it is possible to do sampling overlapping. Example the 730-Monthly = 24 data points (12 months * 2 years) which makes the VaR result difficult to prove statistically significant. This means instead if just taking the month end price changes, we take each day's monthly price change. This will give us a much more significant number of data points to work with. There can of course be issues with auto-correlation using overlapping returns that one has to be aware of. However it can be very challenging to find many years of monthly returns to ensure the results are statistically significant so the auto-correlation issue may be worth it. Again this is up to the risk analyst to decide on the best approach with the data at his disposal.

Forecasting Portfolio Beta

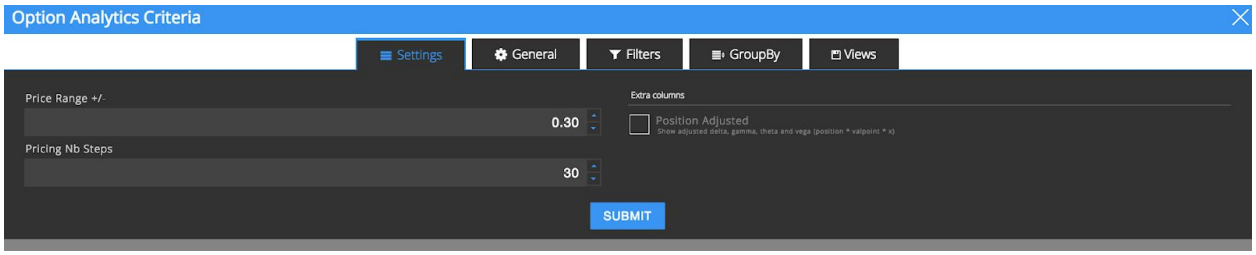
You can use the VaR view to calculate a beta forecast for your portfolio alongside the Value At Risk. To do so select the "show forecast beta" and then the index you want to calculate beta against. The return series used will be the same used for the Value At Risk settings , i.e. sampling, and calculation type.

When you select Show As Ratio in the Generic tab, the Beta % number will be the same as the beta ratio of your portfolio, i.e. a value of 150% means your portfolio is expected to change by 1.5x the amount as the beta index selected. For example if you have selected S&P 500 as an index, and S&P 500 is up 2%, your portfolio is expected to gain 3%.

If you select to use the fund currency, the value you see will be calculated as follows: Portfolio Beta * S&P 500 return given the confidence interval. So if we have selected 95% confidence the calculation will be as follows: portfolio Beta * S&P 500 standard deviation * NORMSINV(95%)=1.6449. So in essence the result is the same as at Value At Risk using S&P 500 as a factor.

3.3. Options Analytics

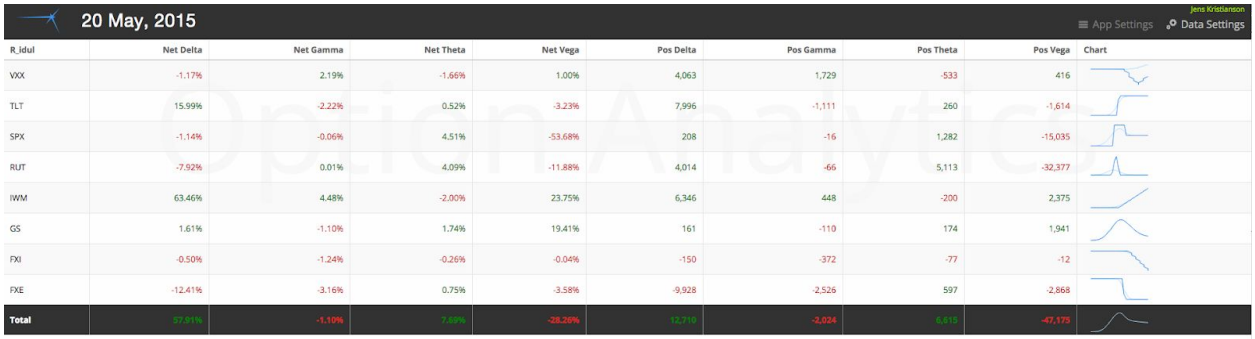
The option analytics engine has been beefed up from previous versions. The capabilities are the same as before but instead of just calculating the "greeks" we are now displaying the greeks and the performance profile for each option position (or group of options, selected via the grouping option).



In the data settings tab, the first thing you are presented with are data concerning settings for the "performance profile". The price range gives you the option to adjust the price range. The underlying price is changed for the performance profile. A value of 0.30 means the underlying price will change from -30% to +30% and option then re-valued. The number of steps gives you the option to select how many steps the model will use from -30% to +30%. The position adjusted layout will adjust the greeks according to your position.

The other tabs are the same as the P&L and VaR views. One thing to note, in GroupBy, pay attention to the groupings to your availability. Let's assume you have a vertical spread position in FXE. The way you should set this up in Tradar PMS would be to assign the IDUL (underlying equity) to point to the FXE ETF. Then in the groupBy tab you would select the IDUL to be the best choice for the first level of grouping.

This is illustrated below, here we see the option positions grouped by the idul as defined in Tradar PMS.



R_idul	Net Delta	Net Gamma	Net Theta	Net Vega	Pos Delta	Pos Gamma	Pos Theta	Pos Vega	Chart
VXX	-1.17%	2.19%	-1.66%	1.00%	4,063	1,729	-533	416	
TLT	15.99%	-2.22%	0.52%	-3.23%	7,996	-1,111	260	-1,614	
SPX	-1.14%	-0.06%	4.51%	-53.68%	208	-16	1,282	-15,035	
RUT	-7.92%	0.01%	4.09%	-11.88%	4,014	-66	5,113	-32,377	
IWM	63.46%	4.48%	-2.00%	23.75%	6,346	448	-200	2,375	
GS	1.61%	-1.10%	1.74%	19.41%	161	-110	174	1,941	
FXI	-0.50%	-1.24%	-0.26%	-0.04%	-150	-372	-77	-12	
FXE	-12.41%	-3.16%	0.75%	-3.58%	-9,928	-2,526	597	-2,868	
Total	97.91%	-1.10%	7.69%	-28.26%	12,710	-2,024	6,615	-47,175	

We can then drill down to position level, in this case we drill down to FXE and we can see we have long 800 options in the 2015-06-19 114 strike call, and short -800 options in the 2015-06-19 112 strike call.

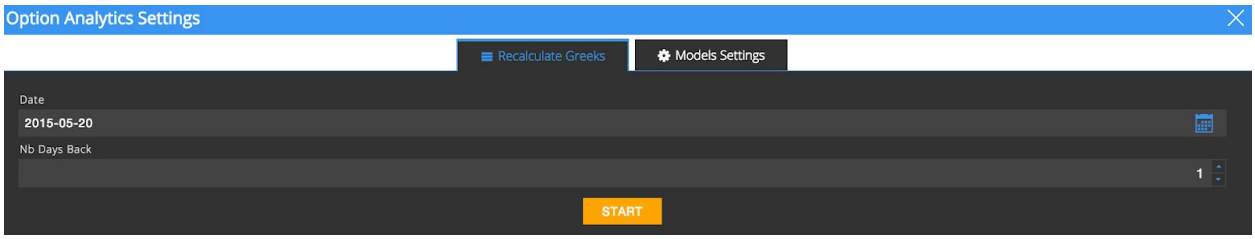
3.3.1 Performance Profile

The chart on the grouping level shows the combined performance profile for all the options. When you drill down you see the performance profile for each position. The solid line is showing us the position at expiration and the lighter line is as of the current date. The combined performance profile is the sum of each option position of your particular grouping.

Description	Positions	Type	Expiry	Strike	Price	Net Delta	Net Gamma	Net Theta	Net Vega	Pos Delta	Pos Gamma	Pos Theta	Pos Vega	Chart
FXE0619C114	800	Equity Call	2015-06-19	114	0.41	11.82%	5.14%	-1.32%	6.19%	9,455	4,109	-1,058	4,953	
FXE0619C112	-800	Equity Call	2015-06-19	112	0.85	-24.23%	-8.29%	2.07%	-9.78%	-19,383	-6,635	1,655	-7,821	
Total						-12.41%	-3.16%	0.75%	-3.58%	-9,928	-2,526	597	-2,868	

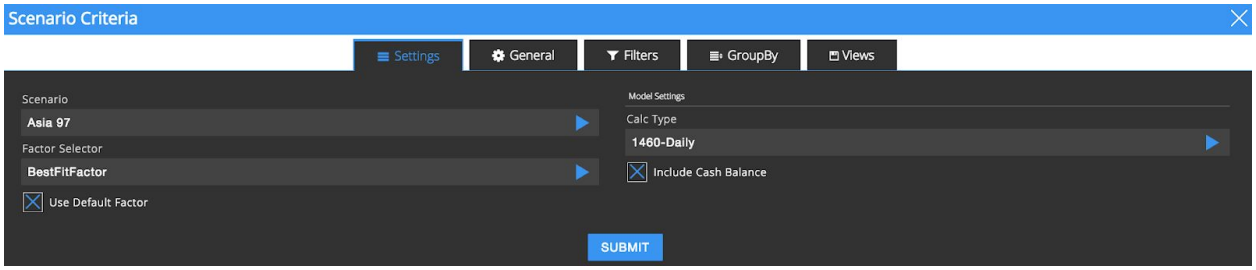
3.3.1 App Settings

The app settings tools give you access to re-calculating the greeks if you so wish, or changing the default option models used. Note the re-calculation of greeks is done each time you run a Tradar-All synchronization.



3.4. Scenario Analysis

The scenario analysis view is similar to the other views. The first settings tab allows you to select the scenario you wish to apply to your portfolio.



Then we need to also choose the calcType, this is the same calc type we use for the Value At Risk tool and defines the type of return series to use.

3.4.1 Factor model selection

There are three factor models at the time of writing Best Fit, Worst Loss and multiple factor regression. Best fit functions as following; As the system runs, each asset is tested against all factors in the scenario, and the best fit factor (through regression analysis) will be chosen for the shock. If there are secondary factors setup, only the main factor will be shocked, and the secondary factors will be shocked according to their relationship to the main factor.

The second option is to use Worst Loss - this will simply select the factor that gives the worst loss for each asset and we ignore the best regression fit.

Lastly the multiple regression model takes into account all factors in the scenario including the correlation between the factors. As you will notice, the multiple regression result will be quite similar to the best fit but multiple regression will include small differences coming from other factors.

You can also use a default factor, and ignore the best fit - let's say you map all your US equity positions to S&P 500 index - even if the system finds that Dow Jones factor might be a better fit to your particular equity position, it will override this with the S&P 500 as the default factor.

As with the Value At Risk tool - you can also opt to include currency cash balances and fx positions.

riskname	Asia 97
BioTech	-69,432
Cambria Global	-147,937
Currency Tactical	-6,808
Hedge	263,723
Hedge Clone	-47,618
IWO Bear Call	6,445
IWO Bull Call	34,000
IWO Bull Put	-5,295
IWO Butterfly	95,102
Penny Stocks	-1,610
Russia	-62,154
Technology	-81,248
Value	-335,576
Vertical Spread	0
Total:	-358,408

The above example shows the Tungsten portfolio run through the Asia 1997 scenario. We have selected riskName as the top groupBy level.

A drill down to position level shows us the position level details, together with the best fit factor (in this example). The factor shock applied and the beta of the position are also displayed next to the position information. In the below example we can see the system has identified SaaS_EUR factor to be the best fit for the EUR cash balance. The FXE options are finding the SaaS_DXY (dollar index) to be the best fitting factor and the JPY cash balance is identifying SaaS_JPY as the right option.

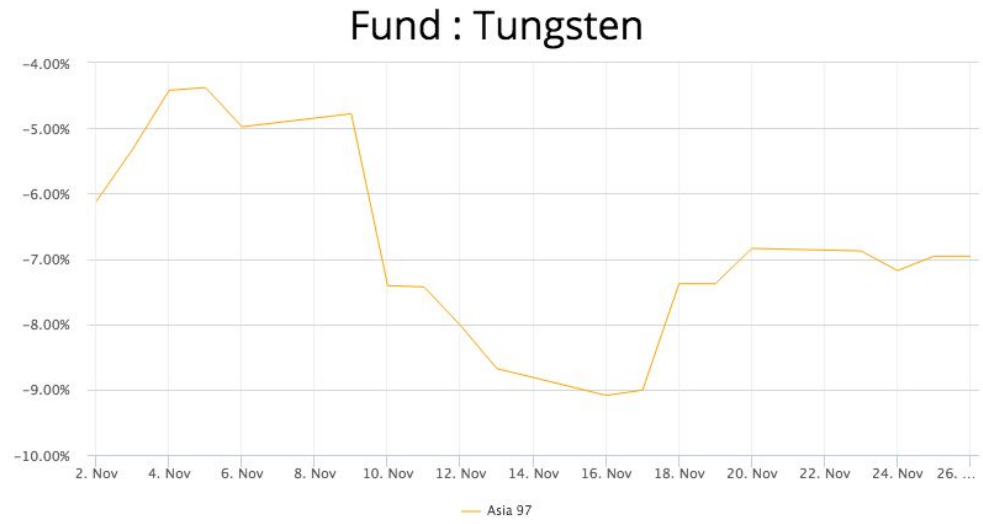
Id	Asia 97	MarketValue	Factor	FactorShock	FactorBeta	Price	Pos
EUR	-295	-3,439	SaaS_EUR	-9.50%	-0.90	0.9014	-3,100
FXE0619C112	-49,087	-42,400	SaaS_DXY	-2.08%	-1.12	0.5300	-800
FXE0619C114	23,933	17,600	SaaS_DXY	-2.08%	-1.12	0.2200	800
JPY	18,641	-2,343,774	SaaS_JPY	-0.80%	1.00	120.6900	-282,870,084
Total:	-6,808	0		0.00%	0.00	0.0000	0

The rest of the tabs are identical to the other views tabs so we will not explain that again.

Please note: If you do not use the Lodestar market data services, you have to map your index data to the Tungsten SaaS_xxx factors. The only factors that you do not need to map are the FX factors such as SaaS_EUR, SaaS_JPY. These will be identified by the system and it will find the appropriate time series data automatically.

3.4.2 Charting scenarios

To see how a particular scenario has changed over time on your portfolio, simply select the Date Range you wish to see, tick the scenario (or several scenarios). Note, the more scenarios you wish to chart, the longer it will take to process the data. It is always advisable to start small first and then increase options and date range as you see speed of the processing. Below is an example of how the Asia 97 scenario has changed throughout the month of November 2015.



Asia 97 Ratio
-6.96%
change : 0.00%
prev : -6.96%

3.4.3 Pre-defined scenarios

Tungsten comes with several predefined scenarios. Below is a list of the scenario's available. From time to time we will be adding new scenarios and shortly we will have an editor available so users can set up their own scenarios.

Scenario	Start Date	End Date	Days
Asia 1997	21-Oct-97	27-Oct-97	6.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-4.43%		
SAAS_BRL	Brazilian Real (BRL)	FX	-3.50%		
SaaS_EUR	Euro (EUR)	FX	-9.50%		
SaaS_GBP	Sterling (GBP)	FX	1.29%		
SaaS_JPY	Japanese Yen (JPY)	FX	-0.80%		
SAAS_THB	Thai Baht (THB)	FX	-20.00%		
SaaS_AEX	AEX Composite Index	single	-9.40%		
SAAS_ARS	Argentine Peso (ARS)	single	-7.75%		

SaaS_BEL20	Brussels Stock Exchange Index	single	-7.78%		
SaaS_C 1	Corn	single	-0.35%		
SaaS_CAC40	CAC40 Index	single	-11.32%		
SaaS_CL1	Crude Oil	single	-0.59%		
SaaS_DAX	DAX Index	single	-12.63%		
SaaS_DJX	Dow Jones Industrial Index	single	-11.16%		
SaaS_DXY	U.S. Dollar Index	single	-2.08%		
SaaS_ED	Eurodollar	single	0.20%		
SaaS_FF	30 Day Federal Funds	single	0.02%		
SaaS_FV	5 Year U.S. Treasury Notes Contract	single	1.87%		
SaaS_GC1	Gold	single	-2.13%		
SaaS_HG1	Copper	single	-4.50%		
SaaS_HSI	Hang Seng Index	single	-26.95%		
SAAS_IBOV	Bovespa Brazil Sao Paolo Stock Exchange Index	single	-24.58%		
SaaS_LB	Lumber	single	-1.42%		
SaaS_NKY	Nikkei 225 Index	single	-7.77%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-26.93%		
SaaS_S 1	Soybean	single	-0.47%		
SaaS_SB1	Sugar	single	1.49%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	-1.17%		
SaaS_SI1	Silver	single	-2.01%		
SaaS_SMI	SMI Index	single	-9.95%		
SaaS_SPX	S&P 500 Composite Index	single	-9.80%		
SaaS_STI	Straits Times	single	-15.48%		
SaaS_TU	2 Year U.S. Treasury Notes Contract	single	0.28%		
SaaS_TY	10 Year U.S. Treasury Notes Contract	single	2.74%		
SaaS_UKX	FTSE 100 Index	single	-7.37%		
SaaS_US	30 Year U.S. Treasury Notes Contract	single	3.97%		
SaaS_VIX	S&P 500 Volatility Index	single	59.34%		
SaaS_W 1	Wheat	single	-1.04%		
SafeYield3M		Yield	-0.20%	1	3
SafeYield6M		Yield	-2.97%	3	6
SafeYield12M		Yield	-5.03%	6	12
SafeYield2Y		Yield	-5.07%	12	24
SafeYield3Y		Yield	-4.68%	24	36

SafeYield5Y		Yield	-4.61%	36	60
SafeYield7Y		Yield	-3.88%	60	84
SafeYield10Y		Yield	-3.75%	84	120
SafeYield20Y		Yield	-3.08%	120	240
RiskyYield_HighYield		Yield	5.75%	-	600
SafeYield30Y		Yield	-2.80%	240	600
volatility1		single	+50.%	0	600

Scenario	Start Date	End Date	Days
Black Monday 1987	16-Oct-87	19-Oct-87	3.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-7.00%		
SAAS_EUR	Euro (EUR)	FX	5.60%		
SaaS_GBP	Sterling (GBP)	FX	-1.52%		
SaaS_JPY	Japanese Yen (JPY)	FX	-0.64%		
SaaS_C 1	Corn	single	-0.77%		
SaaS_CL1	Crude Oil	single	-0.72%		
SaaS_DJX	Dow Jones Industrial Index	single	-22.61%		
SaaS_DXY	U.S. Dollar Index	single	-0.28%		
SaaS_ED	Eurodollar	single	1.41%		
SaaS_FV	5 Year U.S. Treasury Notes	single	20.00%		
SaaS_GC1	Gold	single	1.18%		
SaaS_HSI	Hang Seng Index	single	-33.33%		
SaaS_LB	Lumber	single	-0.49%		
SaaS_NKY	Nikkei 225 Index	single	-14.90%		
SaaS_S 1	Soybean	single	-4.36%		
SaaS_SB1	Sugar	single	-3.15%		
SaaS_SI1	Silver	single	2.13%		
SaaS_SPX	S&P 500 Composite Index	single	-20.47%		
SaaS_TU	2 Year U.S. Treasury Notes	single	10.00%		
SaaS_TY	10 Year U.S. Treasury Notes	single	30.00%		
SaaS_UKX	FTSE 100 Index	single	-5.73%		
SaaS_US	30 Year U.S. Treasury Notes	single	35.00%		

SaaS_VIX	S&P 500 Volatility Index	single	300.00%		
SaaS_W 1	Wheat	single	-0.81%		
RiskyYield_AAA		Yield	4.20%	0	600

Scenario	Start Date	End Date	Days
Lehman Crash	12-Sep-08	15-Sep-08	3.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-22.00%		
SaaS_EUR	Euro (EUR)	FX	-14.00%		
SaaS_GBP	Sterling (GBP)	FX	2.43%		
SaaS_JPY	Japanese Yen (JPY)	FX	-2.34%		
SaaS_AEX	AEX Composite Index	single	-3.64%		
SaaS_BEL20	Brussels Stock Exchange Index	single	-3.49%		
SaaS_C 1	Corn	single	-0.24%		
SaaS_CAC40	CAC40 Index	single	-3.78%		
SaaS_CL1	Crude Oil	single	-3.77%		
SaaS_DAX	DAX Index	single	-2.74%		
SaaS_DJX	Dow Jones Industrial Index	single	-4.42%		
SaaS_DXY	U.S. Dollar Index	single	-1.55%		
SaaS_ED	Eurodollar	single	0.26%		
SaaS_FF	30 Day Federal Funds	single	0.07%		
SaaS_FV	5 Year U.S. Treasury Notes	single	1.22%		
SaaS_GC1	Gold	single	2.83%		
SaaS_HG1	Copper	single	-1.66%		
SaaS_HSI	Hang Seng Index	single	-5.44%		
SAAS_IBOV	Bovespa Brasil Sao Paolo Stock Exchange Index	single	-7.59%		
SaaS_LB	Lumber	single	-1.00%		
SaaS_NKY	Nikkei 225 Index	single	-4.95%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-5.09%		
SAAS_RUT	Russel 2000	single	-4.23%		
SaaS_S 1	Soybean	single	-2.50%		
SaaS_SB1	Sugar	single	-2.42%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	-4.47%		
SaaS_SI1	Silver	single	2.99%		
SaaS_SMI	SMI Index	single	-3.83%		
SaaS_SPX	S&P 500 Composite Index	single	-4.63%		
SaaS_STI	Straits Times	single	-3.27%		

SaaS_TU	2 Year U.S. Treasury Notes	single	0.81%		
SaaS_TY	10 Year U.S. Treasury Notes	single	1.34%		
SaaS_UKX	FTSE 100 Index	single	-3.92%		
SaaS_US	30 Year U.S. Treasury Notes	single	1.25%		
SaaS_VIX	S&P 500 Volatility Index	single	23.54%		
SaaS_W 1	Wheat	single	0.69%		
SaaS_XB1	Gasoline	single	-8.26%		
SafeYield1M		Yield	-73.72%	-	1
SafeYield3M		Yield	-31.54%	1	3
SafeYield6M		Yield	-15.76%	3	6
SafeYield12M		Yield	-17.82%	6	12
SafeYield2Y		Yield	-20.18%	12	24
SafeYield3Y		Yield	-17.96%	24	36
SafeYield5Y		Yield	-12.79%	36	60
SafeYield7Y		Yield	-9.94%	60	84
SafeYield10Y		Yield	-7.22%	84	120
SafeYield20Y		Yield	-5.05%	120	240
RiskyYield_Avg		Yield	7.17%	-	600
SafeYield30Y		Yield	-4.63%	240	600

Scenario	Start Date	End Date	Days
LTCM Sept 1998	26-Aug-98	31-Aug-98	5.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	0.12%		
SaaS_GBP	Sterling (GBP)	FX	2.67%		
SaaS_JPY	Japanese Yen (JPY)	FX	-3.77%		
SaaS_AEX	AEX Composite Index	single	-5.76%		
SaaS_BEL20	Brussels Stock Exchange Index	single	-6.84%		
SaaS_C 1	Corn	single	-1.13%		
SaaS_CAC40	CAC40 Index	single	-6.82%		
SaaS_CL1	Crude Oil	single	-0.43%		
SaaS_DAX	DAX Index	single	-8.41%		
SaaS_DJX	Dow Jones Industrial Index	single	-11.55%		

SaaS_DXY	U.S. Dollar Index	single	-2.31%		
SaaS_ED	Eurodollar	single	0.18%		
SaaS_FF	30 Day Federal Funds	single	0.02%		
SaaS_FV	5 Year U.S. Treasury Notes	single	0.93%		
SaaS_GC1	Gold	single	-1.37%		
SaaS_HG1	Copper	single	-3.03%		
SaaS_HSI	Hang Seng Index	single	-7.14%		
SAAS_IBOV	Bovespa Brasil Sao Paolo Stock Exchange Index	single	-11.92%		
SaaS_LB	Lumber	single	-1.47%		
SaaS_NKY	Nikkei 225 Index	single	-5.10%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-13.47%		
SaaS_S 1	Soybean	single	-3.07%		
SaaS_SB1	Sugar	single	0.33%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	-1.48%		
SaaS_SI1	Silver	single	-3.94%		
SaaS_SMI	SMI Index	single	-8.71%		
SaaS_SPX	S&P 500 Composite Index	single	-11.68%		
SaaS_STI	Straits Times	single	-7.50%		
SaaS_TU	2 Year U.S. Treasury Notes	single	0.46%		
SaaS_TY	10 Year U.S. Treasury Notes	single	1.90%		
SaaS_UKX	FTSE 100 Index	single	-6.79%		
SaaS_US	30 Year U.S. Treasury Notes	single	2.07%		
SaaS_VIX	S&P 500 Volatility Index	single	42.20%		
SaaS_W 1	Wheat	single	-0.65%		
SafeYield3M		Yield	-1.98%	1	3
SafeYield6M		Yield	-1.95%	3	6
SafeYield12M		Yield	-4.07%	6	12
SafeYield2Y		Yield	-4.10%	12	24
SafeYield3Y		Yield	-4.72%	24	36
SafeYield5Y		Yield	-3.91%	36	60
SafeYield7Y		Yield	-3.82%	60	84
SafeYield10Y		Yield	-3.99%	84	120
SafeYield20Y		Yield	-2.33%	120	240
RiskyYield_HighYield		Yield	29.48%	-	600
SafeYield30Y		Yield	-2.57%	240	600

Scenario	Start Date	End Date	Days
September 11 2001	31-Aug-01	21-Sep-01	21.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-8.73%		
SaaS_GBP	Sterling (GBP)	FX	-0.07%		
SaaS_JPY	Japanese Yen (JPY)	FX	-1.71%		
SaaS_AEX	AEX Composite Index	single	-24.33%		
SaaS_BEL20	Brussels Stock Exchange Index	single	-19.72%		
SaaS_CAC40	CAC40 Index	single	-22.10%		
SaaS_CL1	Crude Oil	single	-1.99%		
SaaS_DAX	DAX Index	single	-27.00%		
SaaS_DJX	Dow Jones Industrial Index	single	-17.23%		
SaaS_DXY	U.S. Dollar Index	single	-0.31%		
SaaS_ED	Eurodollar	single	1.02%		
SaaS_FF	30 Day Federal Funds	single	0.85%		
SaaS_FV	5 Year U.S. Treasury Notes	single	2.84%		
SaaS_GC1	Gold	single	3.76%		
SaaS_HG1	Copper	single	-4.19%		
SaaS_HSI	Hang Seng Index	single	-19.44%		
SAAS_IBOV	Bovespa Brasil Sao Paolo Stock Exchange Index	single	-18.86%		
SaaS_LB	Lumber	single	-6.49%		
SaaS_NKY	Nikkei 225 Index	single	-10.81%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-10.40%		
SaaS_S 1	Soybean	single	-6.30%		
SaaS_SB1	Sugar	single	-10.51%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	-1.48%		
SaaS_SI1	Silver	single	5.81%		
SaaS_SMI	SMI Index	single	-22.37%		
SaaS_SPX	S&P 500 Composite Index	single	-14.80%		
SaaS_STI	Straits Times	single	-23.34%		
SaaS_TU	2 Year U.S. Treasury Notes	single	1.45%		
SaaS_TY	10 Year U.S. Treasury Notes	single	2.13%		

SaaS_UKX	FTSE 100 Index	single	-17.05%		
SaaS_US	30 Year U.S. Treasury Notes	single	-2.98%		
SaaS_VIX	S&P 500 Volatility Index	single	71.19%		
SaaS_W 1	Wheat	single	-2.11%		
SafeYield1M		Yield	-37.65%	-	1
SafeYield3M		Yield	-33.23%	1	3
SafeYield6M		Yield	-29.31%	3	6
SafeYield12M		Yield	-25.81%	6	12
SafeYield2Y		Yield	-20.05%	12	24
SafeYield3Y		Yield	-16.37%	24	36
SafeYield5Y		Yield	-11.66%	36	60
SafeYield7Y		Yield	-6.14%	60	84
SafeYield10Y		Yield	-3.09%	84	120
SafeYield20Y		Yield	-2.74%	120	240
RiskyYield_Avg		Yield	10.90%	-	600
SafeYield30Y		Yield	-3.71%	240	600

Scenario	Start	End	Days
Russia 1998	17-Jul-98	31-Aug-98	45.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-9.48%		
SaaS_GBP	Sterling (GBP)	FX	2.34%		
SaaS_JPY	Japanese Yen (JPY)	FX	-0.52%		
SaaS_RUB	Russian Ruble (RUB)	FX	233.33%		
SaaS_AEX	AEX Composite Index	single	-16.28%		
SaaS_BEL20	Brussels Stock Exchange Index	single	-11.88%		
SaaS_CAC40	CAC40 Index	single	-14.20%		
SaaS_CL1	Crude Oil	single	-2.40%		
SaaS_DAX	DAX Index	single	-21.37%		
SaaS_DJX	Dow Jones Industrial Index	single	-19.26%		
SaaS_DXY	U.S. Dollar Index	single	-0.38%		
SaaS_ED	Eurodollar	single	0.24%		
SaaS_FF	30 Day Federal Funds	single	-0.01%		

SaaS_FV	5 Year U.S. Treasury Notes	single	3.34%		
SaaS_GC1	Gold	single	-4.12%		
SaaS_HG1	Copper	single	-7.04%		
SaaS_HSI	Hang Seng Index	single	-15.69%		
SAAS_IBOV	Bovespa Brasil Sao Paolo Stock Exchange Index	single	-41.47%		
SaaS_LB	Lumber	single	1.11%		
SaaS_NKY	Nikkei 225 Index	single	-14.86%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-56.84%		
SaaS_S 1	Soybean	single	-20.48%		
SaaS_SB1	Sugar	single	-18.59%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	-12.51%		
SaaS_SI1	Silver	single	-8.40%		
SaaS_SMI	SMI Index	single	-19.41%		
SaaS_SPX	S&P 500 Composite Index	single	-19.31%		
SaaS_STI	Straits Times	single	-21.79%		
SaaS_TU	2 Year U.S. Treasury Notes	single	1.18%		
SaaS_TY	10 Year U.S. Treasury Notes	single	6.03%		
SaaS_UKX	FTSE 100 Index	single	-14.98%		
SaaS_US	30 Year U.S. Treasury Notes	single	7.97%		
SaaS_VIX	S&P 500 Volatility Index	single	172.83%		
SaaS_W 1	Wheat	single	-2.80%		
SafeYield3M		Yield	-3.50%	1	3
SafeYield6M		Yield	-4.01%	3	6
SafeYield12M		Yield	-7.82%	6	12
SafeYield2Y		Yield	-10.07%	12	24
SafeYield3Y		Yield	-11.50%	24	36
SafeYield5Y		Yield	-10.56%	36	60
SafeYield7Y		Yield	-9.69%	60	84
SafeYield10Y		Yield	-8.35%	84	120
SafeYield20Y		Yield	-6.84%	120	240
RiskyYield_HighYield		Yield	58.58%	-	600
SafeYield30Y		Yield	-7.83%	240	600

Scenario	Start	End	Days

Gulf War 2003	1-Mar-03	21-Mar-03	20.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-3.73%		
SaaS_GBP	Sterling (GBP)	FX	-0.98%		
SaaS_JPY	Japanese Yen (JPY)	FX	3.31%		
SaaS_RUB	Russian Ruble (RUB)	FX	2.50%		
SaaS_AEX	AEX Composite Index	single	3.94%		
SaaS_BEL20	Brussels Stock Exchange Index	single	5.97%		
SaaS_CAC40	CAC40 Index	single	4.65%		
SaaS_CL1	Crude Oil	single	-9.23%		
SaaS_DAX	DAX Index	single	6.49%		
SaaS_DJX	Dow Jones Industrial Index	single	8.73%		
SaaS_DXY	U.S. Dollar Index	single	2.96%		
SaaS_ED	Eurodollar	single	-0.02%		
SaaS_FF	30 Day Federal Funds	single	0.00%		
SaaS_FV	5 Year U.S. Treasury Notes	single	-2.28%		
SaaS_GC1	Gold	single	-4.54%		
SaaS_HG1	Copper	single	-1.78%		
SaaS_HSI	Hang Seng Index	single	-0.97%		
SAAS_IBOV	Bovespa Brasil Sao Paolo Stock Exchange Index	single	10.66%		
SaaS_LB	Lumber	single	0.76%		
SaaS_NKY	Nikkei 225 Index	single	-3.48%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-6.36%		
SaaS_S 1	Soybean	single	0.00%		
SaaS_SB1	Sugar	single	-5.68%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	-3.33%		
SaaS_SI1	Silver	single	-4.36%		
SaaS_SMI	SMI Index	single	6.36%		
SaaS_SPX	S&P 500 Composite Index	single	7.32%		
SaaS_STI	Straits Times	single	3.67%		
SaaS_TU	2 Year U.S. Treasury Notes	single	-0.59%		
SaaS_TY	10 Year U.S. Treasury Notes	single	-3.49%		
SaaS_UKX	FTSE 100 Index	single	4.79%		
SaaS_US	30 Year U.S. Treasury Notes	single	-5.59%		
SaaS_VIX	S&P 500 Volatility Index	single	-5.78%		

SaaS_W 1	Wheat	single	-2.79%		
SafeYield1M		Yield	-2.48%	-	1
SafeYield3M		Yield	-1.67%	1	3
SafeYield6M		Yield	-0.84%	3	6
SafeYield12M		Yield	-9.68%	6	12
SafeYield2Y		Yield	-17.65%	12	24
SafeYield3Y		Yield	-17.80%	24	36
SafeYield5Y		Yield	-15.99%	36	60
SafeYield7Y		Yield	-13.27%	60	84
SafeYield10Y		Yield	-10.78%	84	120
SafeYield20Y		Yield	-8.09%	120	240
RiskyYield_Avg		Yield	0.25%	-	600

Scenario	Start	End	Days
Credit Event 2008	12-Sep-08	15-Oct-08	33.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-19.67%		
SaaS_GBP	Sterling (GBP)	FX	-3.75%		
SaaS_JPY	Japanese Yen (JPY)	FX	-7.40%		
SaaS_RUB	Russian Ruble (RUB)	FX	25.00%		
SaaS_AEX	AEX Composite Index	single	-34.18%		
SaaS_BEL20	Brussels Stock Exchange Index	single	-32.40%		
SaaS_CAC40	CAC40 Index	single	-21.96%		
SaaS_CL1	Crude Oil	single	-18.11%		
SaaS_DAX	DAX Index	single	-22.03%		
SaaS_DJX	Dow Jones Industrial Index	single	-24.90%		
SaaS_DXY	U.S. Dollar Index	single	3.91%		
SaaS_ED	Eurodollar	single	0.21%		
SaaS_FF	30 Day Federal Funds	single	0.70%		
SaaS_FV	5 Year U.S. Treasury Notes	single	-0.43%		
SaaS_GC1	Gold	single	9.36%		
SaaS_HG1	Copper	single	-28.41%		
SaaS_HSI	Hang Seng Index	single	-17.33%		

SAAS_IBOV	Bovespa Brasil Sao Paolo Stock Exchange Index	single	-29.70%		
SaaS_LB	Lumber	single	-6.77%		
SaaS_NKY	Nikkei 225 Index	single	-21.84%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-40.51%		
SaaS_S 1	Soybean	single	-37.41%		
SaaS_SB1	Sugar	single	-37.18%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	-4.09%		
SaaS_SI1	Silver	single	-5.41%		
SaaS_SMI	SMI Index	single	-18.08%		
SaaS_SPX	S&P 500 Composite Index	single	-27.47%		
SaaS_STI	Straits Times	single	-19.89%		
SaaS_TU	2 Year U.S. Treasury Notes	single	0.79%		
SaaS_TY	10 Year U.S. Treasury Notes	single	-4.02%		
SaaS_UKX	FTSE 100 Index	single	-24.68%		
SaaS_US	30 Year U.S. Treasury Notes	single	-4.21%		
SaaS_VIX	S&P 500 Volatility Index	single	169.88%		
SaaS_W 1	Wheat	single	-14.65%		
SaaS_XB1	Gasoline	single	-38.20%		
SafeYield1M		Yield	-96.35%	-	1
SafeYield3M		Yield	-85.23%	1	3
SafeYield6M		Yield	-50.00%	3	6
SafeYield12M		Yield	-43.56%	6	12
SafeYield2Y		Yield	-26.46%	12	24
SafeYield3Y		Yield	-22.04%	24	36
SafeYield5Y		Yield	-2.36%	36	60
SafeYield7Y		Yield	-2.41%	60	84
SafeYield10Y		Yield	-8.02%	84	120
SafeYield20Y		Yield	-4.82%	120	240
RiskyYield_Avg		Yield	45.88%	-	600
SafeYield30Y		Yield	-1.62%	240	600

Scenario	Start	End	Days
Subprime crisis 2007	16-Jul-07	16-Aug-07	31.00

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-9.25%		
SaaS_GBP	Sterling (GBP)	FX	-2.62%		
SaaS_JPY	Japanese Yen (JPY)	FX	-6.57%		
SaaS_AEX	AEX Composite Index	single	-13.32%		
SaaS_BEL20	Brussels Stock Exchange Index	single	-13.98%		
SaaS_CAC40	CAC40 Index	single	-14.04%		
SaaS_CL1	Crude Oil	single	-3.01%		
SaaS_DAX	DAX Index	single	-10.31%		
SaaS_DJX	Dow Jones Industrial Index	single	-7.92%		
SaaS_DXY	U.S. Dollar Index	single	1.50%		
SaaS_ED	Eurodollar	single	0.15%		
SaaS_FF	30 Day Federal Funds	single	0.29%		
SaaS_FV	5 Year U.S. Treasury Notes	single	3.11%		
SaaS_GC1	Gold	single	-2.84%		
SaaS_HG1	Copper	single	-12.24%		
SaaS_HSI	Hang Seng Index	single	-9.94%		
SAAS_IBOV	Bovespa Brasil Sao Paolo Stock Exchange Index	single	-16.31%		
SaaS_LB	Lumber	single	-4.78%		
SaaS_NKY	Nikkei 225 Index	single	-11.46%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-11.43%		
SaaS_S 1	Soybean	single	-12.29%		
SaaS_SB1	Sugar	single	-8.72%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	24.69%		
SaaS_SI1	Silver	single	-11.00%		
SaaS_SMI	SMI Index	single	-9.44%		
SaaS_SPX	S&P 500 Composite Index	single	-8.92%		
SaaS_STI	Straits Times	single	-13.65%		
SaaS_TU	2 Year U.S. Treasury Notes	single	1.29%		
SaaS_TY	10 Year U.S. Treasury Notes	single	3.86%		
SaaS_UKX	FTSE 100 Index	single	-12.52%		
SaaS_US	30 Year U.S. Treasury Notes	single	3.19%		
SaaS_VIX	S&P 500 Volatility Index	single	97.75%		
SaaS_W 1	Wheat	single	6.59%		
SaaS_XB1	Gasoline	single	-7.37%		
SafeYield1M		Yield	-34.11%	-	1

SafeYield3M		Yield	-23.90%	1	3
SafeYield6M		Yield	-16.93%	3	6
SafeYield12M		Yield	-16.57%	6	12
SafeYield2Y		Yield	-16.56%	12	24
SafeYield3Y		Yield	-15.13%	24	36
SafeYield5Y		Yield	-13.94%	36	60
SafeYield7Y		Yield	-12.02%	60	84
SafeYield10Y		Yield	-8.91%	84	120
SafeYield20Y		Yield	-4.22%	120	240
RiskyYield_HighYield		Yield	46.41%	-	600
SafeYield30Y		Yield	-4.28%	240	600

Scenario	Start	End	Days
Oil deflation 2014	23-Jun-14	19-Jan-15	210

factor	name	factor_category	shock	termMin	termMax
SaaS_AUD	Australian Dollar (AUD)	FX	-12.85%		
SAAS_BRL	Brazilian Real (BRL)	FX	-16.41%		
SaaS_EUR	Euro (EUR)	FX	-14.69%		
SaaS_GBP	Sterling (GBP)	FX	-11.24%		
SaaS_JPY	Japanese Yen (JPY)	FX	15.33%		
SaaS_RUB	Russian Ruble (RUB)	FX	89.94%		
SAAS_THB	Thai Baht (THB)	FX	-0.44%		
SaaS_AEX	AEX Composite Index	single	4.75%		
SAAS_ARS	Argentine Peso (ARS)	single	-5.45%		
SaaS_BEL20	Brussels Stock Exchange Index	single	7.84%		
SaaS_C 1	Corn	single	-12.94%		
SaaS_CAC40	CAC40 Index	single	-2.67%		
SaaS_CL1	Crude Oil	single	-54.14%		
SaaS_DAX	DAX Index	single	3.24%		
SaaS_DJX	Dow Jones Industrial Index	single	3.39%		
SaaS_DXY	U.S. Dollar Index	single	15.26%		
SaaS_ED	Eurodollar	single	-0.03%		

SaaS_FF	30 Day Federal Funds	single	-0.02%		
SaaS_FV	5 Year U.S. Treasury Notes	single	0.94%		
SaaS_GC1	Gold	single	7.22%		
SaaS_HG1	Copper	single	-15.63%		
SaaS_HSI	Hang Seng Index	single	4.09%		
SAAS_IBOV	Bovespa Brasil Sao Paolo Stock Exchange Index	single	-11.90%		
SaaS_NKY	Nikkei 225 Index	single	10.70%		
SaaS_RTSI	RTSI - Russian Trading System - Stock Exchange	single	-44.01%		
SAAS_RUT	Russel 2000	single	-1.24%		
SaaS_S 1	Soybean	single	-30.39%		
SaaS_SB1	Sugar	single	-14.12%		
SaaS_SHCOMP	Shanghai Stock Exchange Composite	single	53.94%		
SaaS_SI1	Silver	single	-15.16%		
SaaS_SMI	SMI Index	single	-5.69%		
SaaS_SPX	S&P 500 Composite Index	single	-1.90%		
SaaS_STI	Straits Times	single	1.54%		
SaaS_TU	2 Year U.S. Treasury Notes	single	-0.21%		
SaaS_TY	10 Year U.S. Treasury Notes	single	4.50%		
SaaS_UKX	FTSE 100 Index	single	-3.16%		
SaaS_US	30 Year U.S. Treasury Notes	single	10.46%		
SaaS_VIX	S&P 500 Volatility Index	single	81.15%		
SaaS_W 1	Wheat	single	-8.11%		
SafeYield1M		Yield	-50.00%	-	1
SafeYield3M		Yield	0.00%	1	3
SafeYield6M		Yield	33.33%	3	6
SafeYield12M		Yield	70.00%	6	12
SafeYield2Y		Yield	10.42%	12	24
SafeYield3Y		Yield	-11.46%	24	36
SafeYield5Y		Yield	-23.84%	36	60
SafeYield7Y		Yield	-27.80%	60	84
SafeYield10Y		Yield	-30.80%	84	120
SafeYield20Y		Yield	-32.39%	120	240
RiskyYield_AAA		Yield	-19.20%	-	600
RiskyYield_Avg		Yield	-2.35%	-	600

RiskyYield_HighYield		Yield	36.71%	-	600
SafeYield30Y		Yield	-30.72%	240	600

3.4.4 Fixed Income

There are several ways we can incorporate fixed income into our scenarios. If no specific rate or credit shocks are set up, fixed income instruments will be included if there is a defined time series setup, such as a yield series for a corporate bond. The bonds will be considered

We can also add direct shocks of rates (yields) and credit (spreads) for fixed income and credit. If this is the case we will not take into account the correlation to the other non fixed income factors in the scenario. For example we can set up to shock all corporate bonds that have 5 years left to maturity. In order to do this we define the maturity range to be term min = 59 and term max = 61 (months). We assign a group of fixed income instruments to be shocked to this group using the specific security group. In the above pre-defined scenarios we can have defined corporate bonds to be risky yields, and government bonds to be safe yields.

To shock the credit spread of corporate bonds we can set up a credit shock. Same as with the safe yield shocks we can set up a maturity range to shock the credit of bonds with different maturities. So we can shock the credit spread of a five year bond differently than a three years bond.

3.4.6 Open Protocol Non Predictive Scenarios

Tungsten now also includes the Open Protocol risk aggregation standard stress tests:

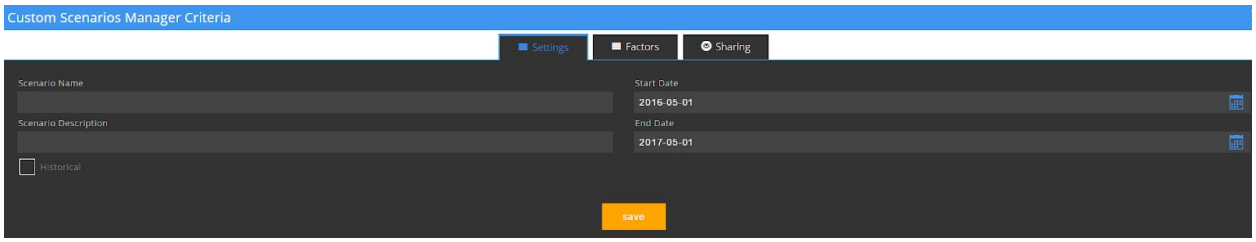
Equity +10%
Equity -10%
Sovereign Interest Rate +10%
Sovereign Interest Rate -10%
Credit +10%
Credit -10%
Convertible Bonds +10%
Convertible Bonds -10%
Commodities +10%
Commodities -10%
USD +10%
USD -10%
Implied Volatility +10%
Implied Volatility -10%

3.4.7 Custom Scenario Editor

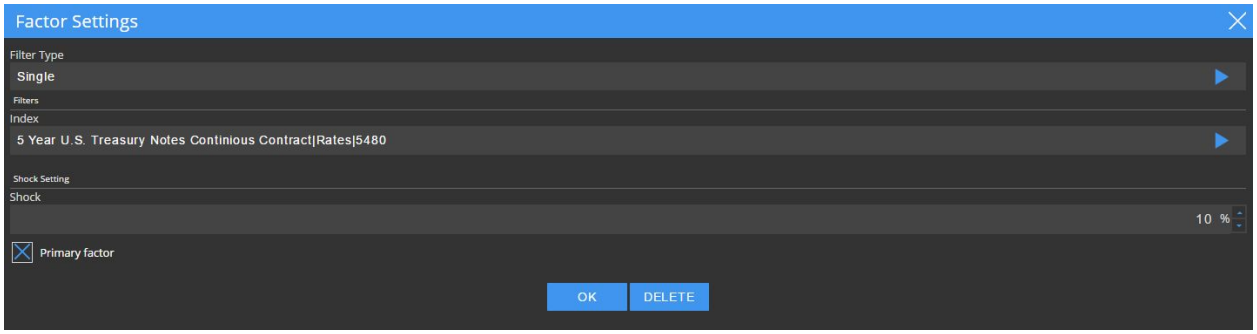
To set up your own custom scenarios you use the Scenario Editor found on the main menu. Once opened you are presented with a list of your custom scenarios. These can be edited or deleted using the icons on the right hand side. By default this page is empty.

To create a new custom scenario simply click the “Add Scenario” in the upper right corner. In the Settings tab, give your scenario a name and description. Tick “Historical” if you want the scenario to use prices of a specific date range in the past. Next - if you selected historical, please enter a Start Date and End Date for the scenario. Note: this is not necessary if you use a predictive scenario where you define shock by

risk factors.

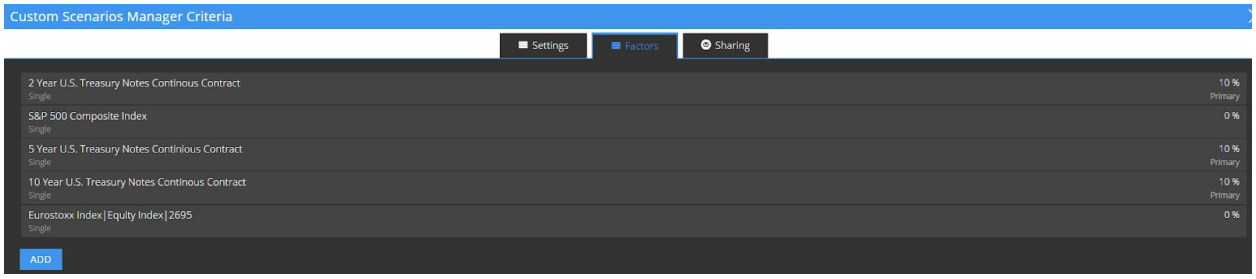


The next tab is factors - this is where you set up your factors to shock.This is when you define predictive scenarios.



Select Single factor type and then the factor from the drop down. The list of factors includes all factors included in the Tungsten package and any additional factors you have set up in Tradar PMS. Next set the factor as primary if you want this to be a driving factor or secondary if you want the primary factor to drive the shock amount of the secondary factor. If you set up more than one factor as primary, the system will do a multiple regression between the primary factors vs each secondary factor to determine the shock amount.

Note: It is advisable to set up more than one factor when you define your custom scenarios. Try to include factors that would be good descriptors of the holdings in your portfolio. For example, if you wish to shock the 2, 5, and 10 year bond futures +10% (rate decrease) and your portfolio consists of US/European equities, add the 2, 5, and 10 year continuous treasury futures as primary factors with the 10% shock amount and then add the S&P 500 and SX5E as secondary factors with 0% shock. When you run the scenario the system will most likely use the equity factors rather than the rates factors but the equity factors have been shocked according to the correlation vs the bond futures.



The below example illustrates the result of the below scenario.

Pos Name	Position	Market Value	Price	2 5 10 Bond Futures +10% Ratio	Factor Name	Factor Shock
AdvisorShares Focused Equity ETF	10,000	282,820	28.28	-0.01%	SaaS_FV	10.00%
ALFA	50,000	1,938,500	38.77	-0.69%	SaaS_SPX	-12.59%
Apple	10,000	1,436,500	143.65	-0.53%	SaaS_SPX	-12.59%
AUD - Australia Dollar	-128	-128	1.00	0.00%	SaaS_SPX	-12.59%
BTX	50,000	170,000	3.40	-0.09%	SaaS_SX5E	-27.08%
CAD - Canada Dollar	504,680	504,680	1.00	0.02%	SaaS_SPX	-12.59%
CHF - Swiss Franc	1,445	1,445	1.00	0.00%	SaaS_SX5E	-27.08%
EEM	20,000	801,200	40.06	-0.37%	SaaS_SPX	-12.59%
EUR - Euro	-37,210	-37,210	1.00	-0.10%	SaaS_SX5E	-27.08%
Europe Stoxx 50	60,000	2,269,800	37.83	-1.08%	SaaS_SPX	-12.59%
Financial ETF	60,000	1,411,800	23.53	-0.66%	SaaS_SPX	-12.59%
FXI	20,000	770,600	38.53	-0.04%	SaaS_SPX	-12.59%
GBP - British Pound	-8,175	-8,175	1.00	0.00%	SaaS_SPX	-12.59%
Global Value	90,000	2,053,800	22.82	-0.62%	SaaS_SPX	-12.59%
Icon PLC	5,000	422,450	84.49	-0.38%	SaaS_SX5E	-27.08%
iShares MSCI Italy	30,000	793,500	26.45	-0.61%	SaaS_SX5E	-27.08%
JPY - Japanese Yen	7,536,808	7,536,808	1.00	-0.73%	SaaS_SX5E	-27.08%
MARKET VECTORS RUSSIA ETF	10,000	208,800	20.88	-0.12%	SaaS_SPX	-12.59%
Micron Technology Inc	20,000	553,400	27.67	-0.38%	SaaS_SPX	-12.59%
MXN - Mexican Peso	1,432	1,432	1.00	0.00%	SaaS_SPX	-12.59%
NOK - Norwegian Krone	2,091	2,091	1.00	0.00%	SaaS_SPX	-12.59%
Nvidia	10,000	1,043,000	104.30	-0.48%	SaaS_SPX	-12.59%
NZD - New Zealand Dollar	-72	-72	1.00	0.00%	SaaS_SPX	-12.59%
Oncocyte	2,000	11,900	5.95	0.00%	SaaS_SPX	-12.59%
PKB	40,000	1,182,800	29.57	-0.55%	SaaS_SPX	-12.59%
QQQ	49,500	6,731,505	135.99	-2.91%	SaaS_SPX	-12.59%
Russia Deep Value ETF	5,000	203,850	40.77	-0.09%	SaaS_SPX	-12.59%
RVX	70,000	102,217	1.99	-0.36%	SaaS_FV	10.00%
SEK - Swedish Krona	-90,618	-90,618	1.00	0.00%	SaaS_TY	10.00%
SGD - Singapore Dollar	-40,211	-40,211	1.00	0.00%	SaaS_SPX	-12.59%
SPDR Gold Trust	20,000	2,415,400	120.77	0.98%	SaaS_TY	10.00%
SPY	17,800	4,237,824	238.08	-1.70%	SaaS_SPX	-12.59%
Tesla Motors	1,000	314,070	314.07	-0.16%	SaaS_SPX	-12.59%
TTM	15,000	535,050	35.67	-0.33%	SaaS_SPX	-12.59%
Velocity Shares Inverse VIX	-10,000	-750,900	75.09	1.30%	SaaS_SPX	-12.59%
XUII	49,995	14,499	0.29	-0.02%	SaaS_SX5E	-27.08%
Total				-10.72%		

As we can see we set up so the 2 5 and 10 year bond futures were the main drivers of the scenario, but we added S&P 500 and Eurostoxx as secondary factors as we know they better describe our portfolio. The scenario result speaks for itself where we can see that mainly the equity factors were chosen and the shock amount if determined by the correlation between the bond futures and the equity indexes.

3.5. Exposure Analysis

The exposure analysis tool allows you to view your portfolio's various exposures. An exposure is a sensitivity type times the position size converted to the system base currency. The out of the box available exposures are outlined below.

3.5.1 Available exposures

Table description:

position=size of position;

valpoint=value of 1 point move.

SensVal=sensitivity value;

fx=currency conversion to system base currency;

price=position price at the risk date..

Group function=how should the group total be aggregated.

The formulas are configurable, and it is also possible to add more sensitivity types.

type	description	category_name	formula	grouping
Exposure	Eze PMA Exposure	Basic Exposures	position*sensVal	Sum
Leverage	Gross Exposure	Basic Exposures	(IIF(position>0, position, position*-1))*sensVal	Sum
MarketValue	Position Market Value in System Currency	Basic Exposures	position*sensVal*valpoint/fx	Sum
Quantity	Position Size	Basic Exposures	position	X
beta	Exposure to broad market	Betas	position*price*valpoint*sensVal/fx	Sum
Beta_10_Day	Beta vs S&P 500 10 Days	Betas	position*price*valpoint*sensVal/fx	Sum
Beta_180_Day	Beta vs S&P 500 90 Days	Betas	position*price*valpoint*sensVal/fx	Sum
Beta_30_Day	Beta vs S&P 500 30 Days	Betas	position*price*valpoint*sensVal/fx	Sum
Beta_90_Day	Beta vs S&P 500 90 Days	Betas	position*price*valpoint*sensVal/fx	Sum
Beta_Decayed	Beta vs S&P 500 0.94 Decay	Betas	position*price*valpoint*sensVal/fx	Sum
Beta_SPX_GFC	Beta vs S&P 500 During Global Financial Crisis	Betas	position*price*valpoint*sensVal/fx	Sum
beta_static	Beta to index from static date	Betas	position*valpoint*sensVal/fx	Sum
Growth	Exposure to Growth	Betas	position*price*valpoint*sensVal/fx	Sum

IntlMomentum	Exposure to International Momentum	Betas	position*price*valpoint*sensVal/fx	Sum
IntlQuality	Exposure to International Quality	Betas	position*price*valpoint*sensVal/fx	Sum
Momentum	Exposure to Momentum	Betas	position*price*valpoint*sensVal/fx	Sum
Quality	Exposure to Quality	Betas	position*price*valpoint*sensVal/fx	Sum
Size	Exposure to Size	Betas	position*price*valpoint*sensVal/fx	Sum
User_Beta	User Defined Beta	Betas	position*price*valpoint*sensVal/fx	Sum
User_Beta_Core	User Defined Beta Core Value	Betas	sensVal	Sum
Value	Exposure to Value	Betas	position*price*valpoint*sensVal/fx	Sum
cr01	Change in position given a 1bp credit increase	Credit	position*sensVal/fx	Sum
cr01_abs	Credit Spread change 0.01% absolute	Credit	position*sensVal/fx	SUM
cr01_Amort	CR01 of Amortizing Bond	Credit	position*sensVal/fx	Sum
cr01_per	Credit Spread change 0.01% percentage	Credit	position*sensVal/fx	SUM
cs-10_abs	Credit Spread change -0.1% absolute	Credit	position*sensVal/fx	Sum
cs-10_pct	Credit Spread change -0.1% percentage	Credit	position*sensVal/fx	Sum
cs-100	Credit Spread change -1%	Credit	position*sensVal/fx	Sum
cs-100_abs	Credit Spread change -1% absolute	Credit	position*sensVal/fx	Sum
cs-1000	Credit Spread change -10%	Credit	position*sensVal/fx	Sum
cs10_abs	Credit Spread change 0.1% absolute	Credit	position*sensVal/fx	Sum
cs10_pct	Credit Spread change 0.1% percentage	Credit	position*sensVal/fx	Sum
cs100	Credit Spread change 1%	Credit	position*sensVal/fx	Sum
cs100_abs	Credit Spread change 1% absolute	Credit	position*sensVal/fx	Sum
cs1000	Credit Spread change 10%	Credit	position*sensVal/fx	Sum
RowCount	Number of datapoint available	Data Veracity	sensVal	Average
Accrued	Accrued Interest	Fixed Income	position*sensVal*valpoint/fx	Sum
convexity	A measure of duration change	Fixed Income	position*sensVal*price*valpoint*0.00005/fx	Average
convexity_Amort	Convexity of Amortizing Bond	Fixed Income	position*sensVal*price*valpoint*0.00005/fx	Average
dv01	Change in position given a 1bp rate cut	Fixed Income	position*sensVal/fx	Sum
dv01_Amort	DV01 of Amortizing Bond	Fixed Income	position*sensVal/fx	Sum
dv01_float	Sensitivity to floating rate change	Fixed Income	position*valpoint*sensVal/fx	Sum
dv10	Change in position value given a 10bp rate cut	Fixed Income	position*sensVal/fx	Sum
dv100	Change in position value given a 100bp rate cut	Fixed Income	position*sensVal/fx	Sum

dv50	Change in position value given a 50bp rate cut	Fixed Income	position*sensVal/fx	Sum
EffectiveDuration	Change in Bond price given a +-1% change in yield (p1-p2)/(2*p0*yieldChg)	Fixed Income	position*sensVal*valpoint/fx	Average_CapWeight
hedgeRatio	DV01 of Bond / DV01 of 10 year bond equivalent	Fixed Income	position*sensVal*price*valpoint*0.01/fx	Sum
ir01	Sensitivity to rate change	Fixed Income	position*valpoint*sensVal/fx	Sum
IRR_Amort	Internal Rate of Return Amortizing Bond	Fixed Income	position*sensVal/fx	Sum
keyRate10Y	Key Rate Duration 10 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate15Y	Key Rate Duration 15 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate1Y	Key Rate Duration 1 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate20Y	Key Rate Duration 20 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate25Y	Key Rate Duration 25 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate2Y	Key Rate Duration 2 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate30Y	Key Rate Duration 30 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate3m	Key Rate Duration 3Months	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate3Y	Key Rate Duration 3 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate5Y	Key Rate Duration 5 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
keyRate7Y	Key Rate Duration 7 Year	Fixed Income	position*(-1)*sensVal*0.01/fx	Sum
macaulayDuration	Weighted average years until cash flows are received	Fixed Income	sensVal	Average_CapWeight
macaulayDuration_Amort	Macaulay Duration of Amortizing Bond	Fixed Income	sensVal	Average_CapWeight
modifiedDuration	Change in bond price given a 1% increase in yield.	Fixed Income	position*sensVal*price*valpoint*0.01/fx	Sum
modifiedDuration_Amort	Modified Duration of Amortizing Bond	Fixed Income	position*sensVal*price*valpoint*0.01/fx	Sum
modifiedDuration_pct	Percentage change in bond price given a 1% increase in bond yield	Fixed Income	sensVal	Sum
rho	Sensitivity to rate change (otion)	Fixed Income	position*valpoint*sensVal/fx	Sum
rr01	Sensitivity to Recovery Rate Change	Fixed Income	position*valpoint*sensVal/fx	Sum
yieldValueBasisPoint_Amort	Yield Value Basis Point Amortizing Bond	Fixed Income	position*sensVal/fx	Sum
ytm	Yield to maturity	Fixed Income	sensVal	Average

ytm_Amort	Yield to Maturity of Amortizing Bond	Fixed Income	sensVal	Average
ytm_capWeight	Yield to maturity cap weighted	Fixed Income	sensVal	Average_CapWeight
ytm_sign	Yield to maturity with position sign	Fixed Income	(IIF(position>0, 1, -1))*sensVal	Average
ytw	Yield to Worst	Fixed Income	sensVal	Average
ytw_Amort	Yield to Worst of Amortizing Bond	Fixed Income	sensVal	Average
ytw_dt	Yield date used for calculations	Fixed Income	sensVal	Average
ADV1	1% of average daily volume	Liquidity	(IIF(position>0, position, position*-1))/sensVal	Average
ADV10	10% of average daily volume	Liquidity	(IIF(position>0, position, position*-1))/sensVal	Average
ADV20	20% of average daily volume	Liquidity	(IIF(position>0, position, position*-1))/sensVal	Average
ADV30	30% of average daily volume	Liquidity	(IIF(position>0, position, position*-1))/sensVal	Average
ADV5	5% of average daily volume	Liquidity	(IIF(position>0, position, position*-1))/sensVal	Average
UL-100_delta	Delta change due to underlying shock of -1%	Option Delta Scenarios	position*sensVal*valpoint/fx	Sum
UL-100_delta_actual	Delta actual after underlying shock of -1%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(0.99)/fx	Sum
UL-1000_delta	Delta change due to underlying shock of -10%	Option Delta Scenarios	position*sensVal*valpoint/fx	Sum
UL-1000_delta_actual	Delta actual after underlying shock of -10%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(0.90)/fx	Sum
UL-2000_delta	Delta change due to underlying shock of -20.0%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL-2000_delta_actual	Delta actual after underlying shock of -20.0%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(0.8)/fx	Sum
UL-250_delta	Delta change due to underlying shock of -2.5%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL-250_delta_actual	Delta actual after underlying shock of -2.5%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(0.975)/fx	Sum
UL-2500_delta	Delta change due to underlying shock of -25.0%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL-2500_delta_actual	Delta actual after underlying shock of -25.0%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(0.75)/fx	Sum

UL-4000_delta	Delta change due to underlying shock of -40%	Option Delta Scenarios	position*sensVal*valpoint/fx	Sum
UL-4000_delta_actual	Delta actual after underlying shock of -40%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(0.60)/fx	Sum
UL-500_delta	Delta change due to underlying shock of -5.0%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL-500_delta_actual	Delta actual after underlying shock of -5.0%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(0.95)/fx	Sum
UL-5000_delta	Delta change due to underlying shock of -50.0%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL-5000_delta_actual	Delta actual after underlying shock of -50.0%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(0.5)/fx	Sum
UL100_delta	Delta change due to underlying shock of 1%	Option Delta Scenarios	position*sensVal*valpoint/fx	Sum
UL100_delta_actual	Delta actual after underlying shock of 1%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(1.01)/fx	Sum
UL1000_delta	Delta change due to underlying shock of 10%	Option Delta Scenarios	position*sensVal*valpoint/fx	Sum
UL1000_delta_actual	Delta actual after underlying shock of 10%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(1.1)/fx	Sum
UL2000_delta	Delta change due to underlying shock of +20.0%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL2000_delta_actual	Delta actual after underlying shock of +20.0%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(1.2)/fx	Sum
UL250_delta	Delta change due to underlying shock of 2.5%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL250_delta_actual	Delta actual after underlying shock of 2.5%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(1.025)/fx	Sum
UL2500_delta	Delta change due to underlying shock of +25.0%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL2500_delta_actual	Delta actual after underlying shock of +25.0%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(1.25)/fx	Sum
UL4000_delta	Delta change due to underlying shock of 40%	Option Delta Scenarios	position*sensVal*valpoint/fx	Sum
UL4000_delta_actual	Delta actual after underlying shock of 40%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(1.4)/fx	Sum
UL500_delta	Delta change due to underlying shock of 5.0%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum

UL500_delta_actual	Delta actual after underlying shock of 5.0%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(1.05)/fx	Sum
UL5000_delta	Delta change due to underlying shock of +50.0%	Option Delta Scenarios	position*valpoint*sensVal/fx	Sum
UL5000_delta_actual	Delta actual after underlying shock of +50.0%	Option Delta Scenarios	position*sensVal*valpoint*idulPrice*(1.5)/fx	Sum
UL-100_gamma	Gamma change due to underlying shock of -1%	Option Gamma Scenarios	position*sensVal*valpoint/fx	Sum
UL-100_gamma_actual	Gamma actual after underlying shock of -1%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(0.99)/fx	Sum
UL-1000_gamma	Gamma change due to underlying shock of -10%	Option Gamma Scenarios	position*sensVal*valpoint/fx	Sum
UL-1000_gamma_actual	Gamma actual after underlying shock of -10%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(0.90)/fx	Sum
UL-2000_gamma	Gamma change due to underlying shock of -20.0%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL-2000_gamma_actual	Gamma actual after underlying shock of -20.0%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(0.80)/fx	Sum
UL-250_gamma	Gamma change due to underlying shock of -2.5%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL-250_gamma_actual	Gamma actual after underlying shock of -2.5%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(0.975)/fx	Sum
UL-2500_gamma	Gamma change due to underlying shock of -25.0%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL-2500_gamma_actual	Gamma actual after underlying shock of -25.0%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(0.75)/fx	Sum
UL-4000_gamma	Gamma change due to underlying shock of -40%	Option Gamma Scenarios	position*sensVal*valpoint/fx	Sum
UL-4000_gamma_actual	Gamma actual after underlying shock of -40%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(0.60)/fx	Sum
UL-500_gamma	Gamma change due to underlying shock of -5.0%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL-500_gamma_actual	Gamma actual after underlying shock of -5.0%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(0.95)/fx	Sum
UL-5000_gamma	Gamma change due to underlying shock of -50.0%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL-5000_gamma_actual	Gamma actual after underlying shock of -50.0%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(0.5)/fx	Sum

UL100_gamma	Gamma change due to underlying shock of 1%	Option Gamma Scenarios	position*sensVal*valpoint/fx	Sum
UL100_gamma_actual	Gamma actual after underlying shock of 1%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(1.01)/fx	Sum
UL1000_gamma	Gamma change due to underlying shock of 10%	Option Gamma Scenarios	position*sensVal*valpoint/fx	Sum
UL1000_gamma_actual	Gamma actual after underlying shock of 10%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(1.1)/fx	Sum
UL2000_gamma	Gamma change due to underlying shock of +20.0%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL2000_gamma_actual	Gamma actual after underlying shock of +20.0%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(1.2)/fx	Sum
UL250_gamma	Gamma change due to underlying shock of 2.5%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL250_gamma_actual	Gamma actual after underlying shock of 2.5%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(1.025)/fx	Sum
UL2500_gamma	Gamma change due to underlying shock of +25.0%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL2500_gamma_actual	Gamma actual after underlying shock of +25.0%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(1.25)/fx	Sum
UL4000_gamma	Gamma change due to underlying shock of 40%	Option Gamma Scenarios	position*sensVal*valpoint/fx	Sum
UL4000_gamma_actual	Gamma actual after underlying shock of 40%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(1.4)/fx	Sum
UL500_gamma	Gamma change due to underlying shock of 5.0%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL500_gamma_actual	Gamma actual after underlying shock of 5.0%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(1.05)/fx	Sum
UL5000_gamma	Gamma change due to underlying shock of +50.0%	Option Gamma Scenarios	position*valpoint*sensVal/fx	Sum
UL5000_gamma_actual	Gamma actual after underlying shock of +50.0%	Option Gamma Scenarios	position*sensVal*valpoint*idulPrice*(1.5)/fx	Sum
delta	Option delta	Option Greeks	position*sensVal*valpoint*idulPrice/fx	Sum
deltaForward	Option delta forward	Option Greeks	position*sensVal*valpoint*idulPrice/fx	Sum
dividendRho	Option dividend rho	Option Greeks	position*valpoint*sensVal/fx	Sum
elasticity	Option elasticity	Option Greeks	position*valpoint*sensVal/fx	Sum

gamma	Option Gamma - delta change due to 1 point shock of underlying	Option Greeks	position*sensVal*valpoint*idulPrice/fx	Sum
gamma2	Option Gamma2 - delta change due to +/- 0.5% shock of underlying	Option Greeks	position*sensVal*valpoint*idulPrice/fx	Sum
implVol	Option implied volatiity	Option Greeks	sensVal	Average
strikeSensitivity	Option Strike Sensitivity	Option Greeks	position*valpoint*sensVal/fx	Sum
theta	option theta	Option Greeks	position*valpoint*sensVal/fx	Sum
vega	Option Vega - sensitivity to 1% increase in volatility	Option Greeks	position*sensVal*valpoint*0.01/fx	Sum
VG-1000	Vega shock -10%	Option Greeks	position*valpoint*sensVal/fx	Sum
VG1000	Vega shock 10%	Option Greeks	position*valpoint*sensVal/fx	Sum
UL-100_rho	Theta change due to underlying shock of -1%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL-100_rho_actual	Theta actual after underlying shock of -1%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(0.99)/fx	Sum
UL-100_theta	Theta change due to underlying shock of -1%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL-100_theta_actual	Theta actual after underlying shock of -1%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(0.99)/fx	Sum
UL-1000_rho	Theta change due to underlying shock of -10%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL-1000_rho_actual	Theta actual after underlying shock of -10%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(0.9)/fx	Sum
UL-1000_theta	Theta change due to underlying shock of -10%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL-1000_theta_actual	Theta actual after underlying shock of -10%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(0.9)/fx	Sum
UL-4000_rho	Theta change due to underlying shock of -40%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL-4000_rho_actual	Theta actual after underlying shock of -40%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(0.60)/fx	Sum
UL-4000_theta	Theta change due to underlying shock of -40%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL-4000_theta_actual	Theta actual after underlying shock of -40%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(0.6)/fx	Sum
UL100_rho	Theta change due to underlying shock of 1%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum

UL100_rho_actual	Theta actual after underlying shock of 1%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(1.01)/fx	Sum
UL100_theta	Theta change due to underlying shock of 1%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL100_theta_actual	Theta actual after underlying shock of 1%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(1.01)/fx	Sum
UL1000_rho	Theta change due to underlying shock of 10%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL1000_rho_actual	Theta actual after underlying shock of 10%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(1.1)/fx	Sum
UL1000_theta	Theta change due to underlying shock of 10%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL1000_theta_actual	Theta actual after underlying shock of 10%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(1.1)/fx	Sum
UL4000_rho	Theta change due to underlying shock of 40%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL4000_rho_actual	Theta actual after underlying shock of 40%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(1.4)/fx	Sum
UL4000_theta	Theta change due to underlying shock of 40%	Option Theta Scenarios	position*sensVal*valpoint/fx	Sum
UL4000_theta_actual	Theta actual after underlying shock of 40%	Option Theta Scenarios	position*sensVal*valpoint*idulPrice*(1.4)/fx	Sum
UL-100	Option underlying shock -1%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
ul-1000	Option underlying shock -10%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
ul-1500	Option underlying shock -15%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
ul-2000	Option underlying shock -20%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
UL-250	Underlying change of -2.5%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum

UL-2500	Option underlying shock -25%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
ul-3000	Option underlying shock -30%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
UL-500	Underlying change of -5.0%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
UL-5000	Option underlying shock -50%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
UL100	Option underlying shock +1%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
ul1000	Option underlying shock 10%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
ul1500	Option underlying shock 15%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
ul2000	Option underlying shock 20%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
UL250	Underlying change of 2.5%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
UL2500	Option underlying shock +25%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
ul3000	Option underlying shock 30%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
UL500	Underlying change of 5.0%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum
UL5000	Option underlying shock +50%	Option Underlying Scenarios	position*valpoint*sensVal/fx	Sum

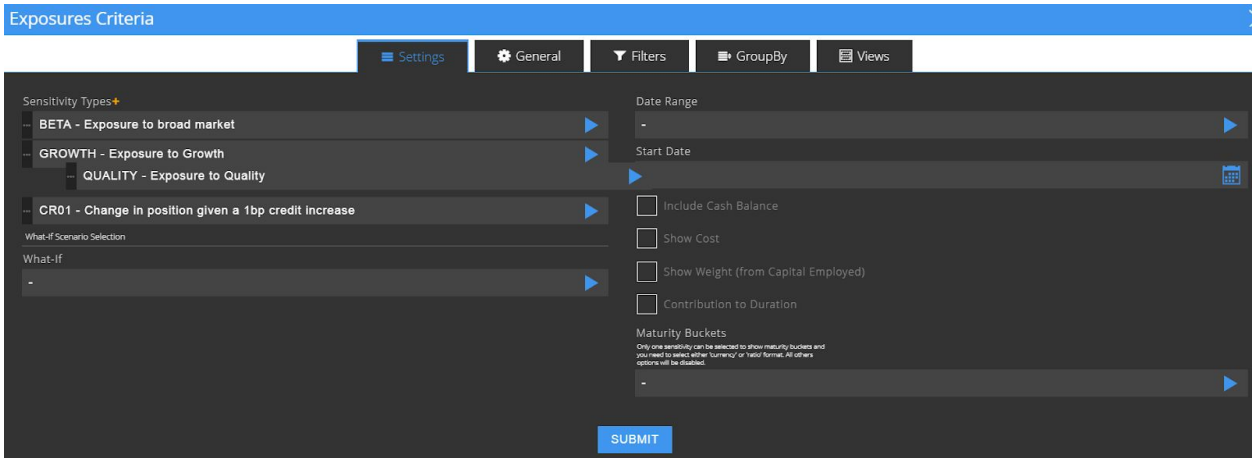
UL-100_vega	Vega change due to underlying shock of -1%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-100_vega_actual	Vega actual after underlying shock of -1%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-1000_vega	Vega change due to underlying shock of -10%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-1000_vega_actual	Vega actual after underlying shock of -10%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-2000_VEGA	Vega change due to underlying shock of -20%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-2000_VEGA_Actual	Vega actual after underlying shock of -20%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-250_VEGA	Vega change due to underlying shock of -2.5%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-250_VEGA_Actual	Vega actual after underlying shock of -2.5%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-2500_VEGA	Vega change due to underlying shock of -25%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-2500_VEGA_Actual	Vega actual after underlying shock of -25%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-4000_vega	Vega change due to underlying shock of -40%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-4000_vega_actual	Vega actual after underlying shock of -40%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-500_VEGA	Vega change due to underlying shock of -5%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-500_VEGA_Actual	Vega actual after underlying shock of -5%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-5000_VEGA	Vega change due to underlying shock of -50%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL-5000_VEGA_Actual	Vega actual after underlying shock of -50%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL100_vega	Vega change due to underlying shock of 1%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL100_vega_actual	Vega actual after underlying shock of 1%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL1000_vega	Vega change due to underlying shock of 10%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum

UL1000_vega_actual	Vega actual after underlying shock of 10%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL2000_VEGA	Vega change due to underlying shock of 20%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL2000_VEGA_Actual	Vega actual after underlying shock of 20%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL250_VEGA	Vega change due to underlying shock of 2.5%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL250_VEGA_Actual	Vega actual after underlying shock of 2.5.0%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL2500_VEGA	Vega change due to underlying shock of 25%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL2500_VEGA_Actual	Vega actual after underlying shock of 25%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL4000_vega	Vega change due to underlying shock of 40%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL4000_vega_actual	Vega actual after underlying shock of 40%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL500_VEGA	Vega change due to underlying shock of 5%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL500_VEGA_Actual	Vega actual after underlying shock of 5%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL5000_VEGA	Vega change due to underlying shock of 50%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
UL5000_VEGA_Actual	Vega actual after underlying shock of 50%	Option Vega Scenarios	position*sensVal*valpoint*0.01/fx	Sum
VOL-100_abs	Absolute Volatility shock -1%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL-1000_abs	Absolute Volatility shock -10.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL-1500_abs	Absolute Volatility shock -15.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL-2000_abs	Absolute Volatility shock -20.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL-250_abs	Absolute Volatility shock -2.5%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL-500_abs	Absolute Volatility shock -5.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum

VOL-5000_abs	Absolute Volatility shock -50.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL100_abs	Absolute Volatility shock +1%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL1000_abs	Absolute Volatility shock +10.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL1500_abs	Absolute Volatility shock +15.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL2000_abs	Absolute Volatility shock +20.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL250_abs	Absolute Volatility shock +2.5%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL500_abs	Absolute Volatility shock +5.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
VOL5000_abs	Absolute Volatility shock +50.0%	Option Vol Scenarios	position*valpoint*sensVal/fx	Sum
idulPx	Underlying Price	Price	sensVal	X
riskpx	Risk price	Price	position*valpoint*sensVal/fx	Sum
CB_UL_VOL	Underlying volatility	Realized Volatility	sensVal	Average
ewVol	Exponential weighted volatility	Realized Volatility	position*valpoint*sensVal/fx	Average
hist120Day	Historical volatility 120 days	Realized Volatility	sensVal	Average
hist180Day	Historical volatility 180 days	Realized Volatility	sensVal	Average
hist30Day	Historical volatility (30days)	Realized Volatility	sensVal	Average
hist365Day	Historical volatility 365 days	Realized Volatility	sensVal	Average
hist90Day	Historical volatility 90 days	Realized Volatility	sensVal	Average
BondFloor	Present value of the bonds cash flows	Spreads	sensVal	Average
CBParity	IValue of bond converted with todays stock price	Spreads	sensVal	Average
CBPremium	Excess of bond price above parity	Spreads	sensVal	Average

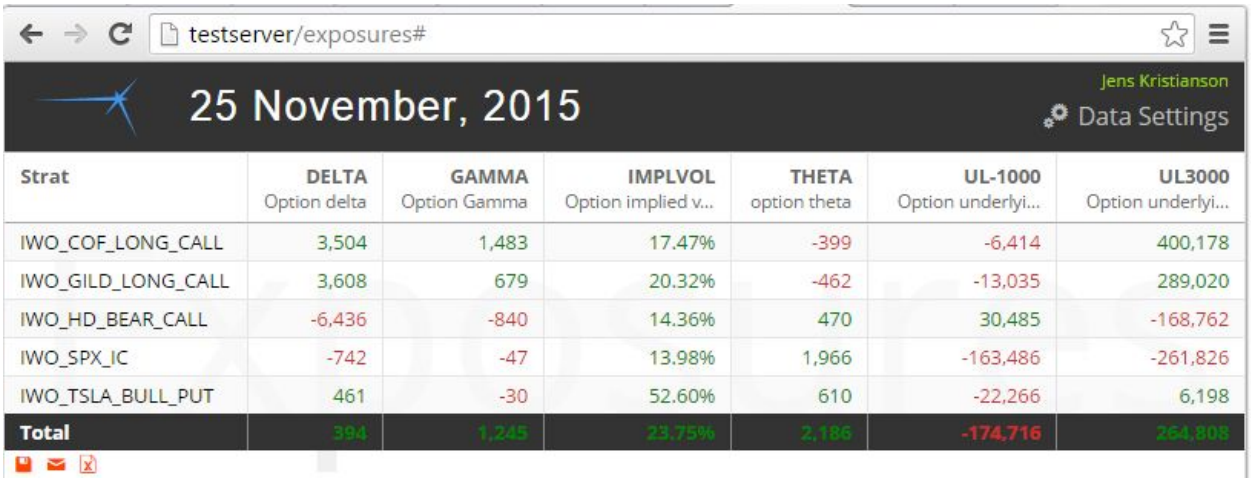
CDS_Spread	The spread CDS was marked at if not full curve	Spreads	sensVal	Average
ImplCreditSpd	Implied Credit Spread	Spreads	sensVal	Average
spread	Bond vs Benchmark spread	Spreads	sensVal	Average
zspread	Bond ZSpread	Spreads	sensVal	Average
zSpread_Amort	ZSpread of Amortizing Bond	Spreads	sensVal	Average

To start viewing exposures, simply select from the drop down on the Settings tab. To view several exposures in the same grid, click on the + icon to add another Combo box, see image below:



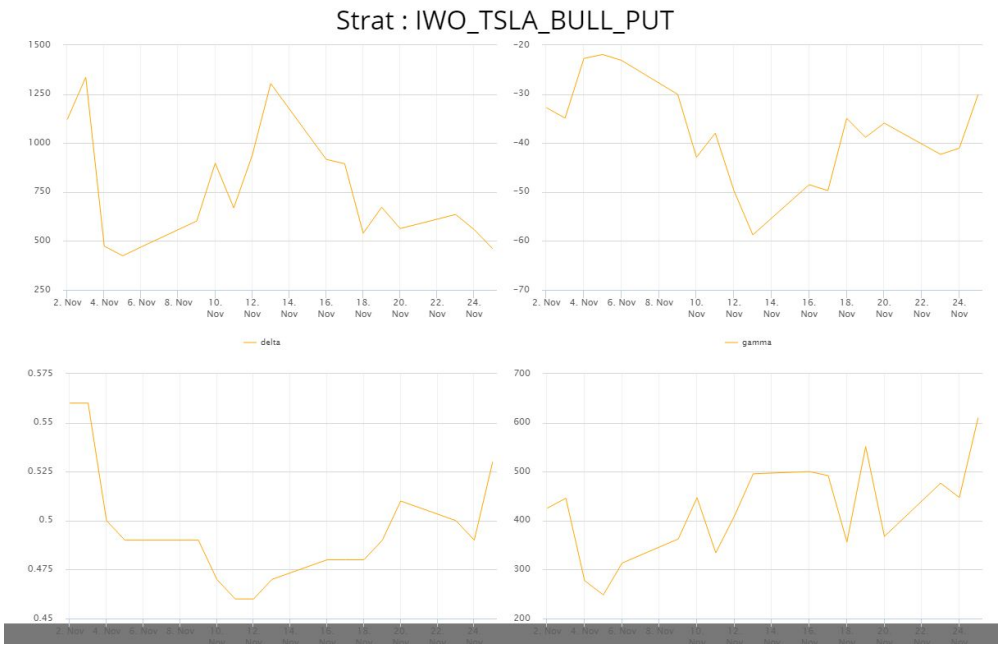
Note: it is possible to drag the columns around to different locations in the list so you can carefully design your output.

Result, in this case we have grouped it by strategy.



Strat	DELTA Option delta	GAMMA Option Gamma	IMPLVOL Option implied v...	THETA option theta	UL-1000 Option underlyi...	UL3000 Option underlyi...
IWO_COF_LONG_CALL	3,504	1,483	17.47%	-399	-6,414	400,178
IWO_GILD_LONG_CALL	3,608	679	20.32%	-462	-13,035	289,020
IWO_HD_BEAR_CALL	-6,436	-840	14.36%	470	30,485	-168,762
IWO_SPX_IC	-742	-47	13.98%	1,966	-163,486	-261,826
IWO_TSLA_BULL_PUT	461	-30	52.60%	610	-22,266	6,198
Total	394	1,245	23.75%	2,186	-174,716	264,808

Note, it is possible to view exposures also as a chart over time. On the Settings menu, simply select the Date Range you wish to use (x-axis) and the exposures. As with the other views you can of course save the views as usual and create reports out of the saved views. More on that in the next section.

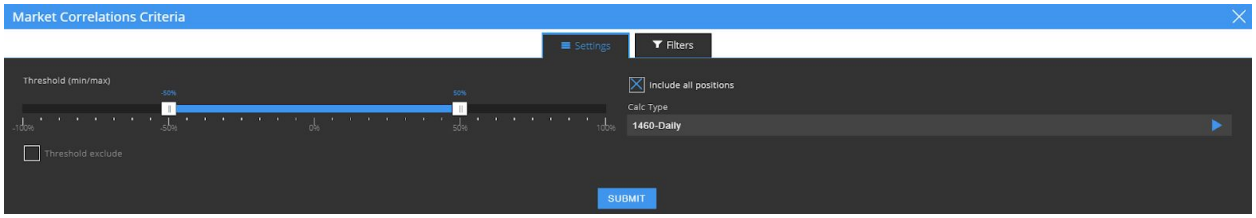


4.0. Correlations

The correlations tool gives you access to the correlation matrix used by the system. By default the correlation between all the risk factors in the system is displayed.

	AEX ...	AUS...	ARG...	S&P ...	AUS...	BRU...	BRA...	CORN	CAC...	CRU...	DAX ...	DO...	U.S. ...	EUR...	EUR...	30 D...	5 YE...	STE...	GOLD	COP...	HAN...	BOV...	JAPA...	MSC...	MSC...	NIK...
AEX C...	100%	36%	-3%	-5%	9%	91%	4%	-4%	93%	-2%	-3%	-1%	3%	4%	-21%	8%	1%	1%	0%	-1%	22%	32%	19%	0%	1%	40%
AUSTR...	36%	100%	-1%	-0%	-1%	34%	4%	-3%	36%	3%	12%	8%	-0%	1%	-12%	4%	-2%	-2%	-2%	6%	25%	18%	10%	21%	7%	28%
ARGE...	-3%	-1%	100%	-2%	2%	-1%	-2%	4%	-2%	4%	6%	4%	2%	1%	2%	3%	0%	-1%	-4%	-5%	2%	-3%	2%	4%	5%	5%
S&P 1...	-5%	-0%	-2%	100%	-1%	-5%	3%	2%	-4%	2%	-0%	2%	-2%	-2%	9%	2%	-5%	4%	-3%	-0%	-1%	-3%	-2%	0%	-0%	-2%
AUSTR...	9%	-1%	2%	-1%	100%	8%	3%	11%	9%	4%	6%	5%	-3%	-0%	41%	-2%	-3%	42%	1%	-2%	17%	17%	-21%	13%	4%	1%
BRUSS...	91%	34%	-1%	-5%	8%	100%	5%	-3%	91%	-1%	-2%	-1%	3%	4%	-19%	7%	4%	0%	-1%	-1%	21%	29%	20%	-1%	1%	39%
BRAZI...	4%	4%	-2%	3%	3%	5%	100%	-5%	4%	6%	-3%	-3%	-2%	2%	0%	6%	4%	1%	0%	-2%	3%	3%	-3%	-5%	-5%	3%
CORN	-4%	-3%	4%	2%	11%	-3%	-5%	100%	-2%	8%	3%	4%	-5%	-3%	8%	-1%	-1%	4%	8%	4%	1%	1%	-4%	5%	-0%	-1%
CAC40...	93%	36%	-2%	-4%	9%	91%	4%	-2%	100%	-3%	-3%	-2%	4%	4%	-18%	9%	3%	-0%	-0%	0%	23%	31%	19%	-1%	1%	40%
CRUD...	-2%	3%	4%	2%	4%	-1%	6%	8%	-3%	100%	18%	31%	-14%	-4%	0%	9%	-16%	6%	7%	22%	7%	-2%	-4%	25%	11%	-1%
DAX I...	-3%	12%	6%	-0%	6%	-2%	-3%	3%	-3%	18%	100%	55%	19%	-10%	3%	3%	-26%	11%	-17%	17%	39%	6%	-1%	57%	60%	7%
DOW J...	-1%	8%	4%	2%	5%	-1%	-3%	4%	-2%	31%	55%	100%	6%	-8%	3%	5%	-28%	9%	-11%	17%	22%	4%	-1%	42%	76%	0%
U.S. D...	3%	-0%	2%	-2%	-3%	3%	-2%	-5%	4%	-14%	19%	6%	100%	-15%	-9%	-5%	-30%	-12%	-35%	-8%	10%	4%	7%	3%	23%	1%
EURO...	4%	1%	1%	-2%	-0%	4%	2%	-3%	4%	-4%	-10%	-8%	-15%	100%	1%	7%	29%	-0%	16%	-3%	-5%	2%	2%	-7%	-11%	-2%
EURO ...	-21%	-12%	2%	9%	41%	-19%	0%	8%	-18%	0%	3%	3%	-9%	1%	100%	0%	-1%	52%	2%	-1%	2%	-2%	-33%	6%	1%	-20%
30 DA...	8%	4%	3%	2%	-2%	7%	6%	-1%	9%	9%	3%	5%	-5%	7%	0%	100%	3%	2%	3%	1%	0%	5%	-2%	2%	4%	2%
5 YEA...	1%	-2%	0%	-5%	-3%	4%	4%	-1%	3%	-16%	-26%	-28%	-30%	29%	-1%	3%	100%	-2%	31%	-11%	-13%	3%	-5%	-18%	-31%	-3%
STERLI...	1%	-2%	-1%	4%	42%	0%	1%	4%	-0%	6%	11%	9%	-12%	-0%	52%	2%	-2%	100%	1%	-0%	9%	5%	-13%	12%	6%	4%
GOLD	0%	-2%	-4%	-3%	1%	-1%	0%	8%	-0%	7%	-17%	-11%	-35%	16%	2%	3%	31%	1%	100%	6%	-6%	3%	-1%	-1%	-20%	-2%
COPPER	-1%	6%	-5%	-0%	-2%	-1%	-2%	4%	0%	22%	17%	17%	-8%	-3%	-1%	1%	-11%	-0%	6%	100%	12%	-2%	4%	28%	8%	0%
HANG...	22%	25%	2%	-1%	17%	21%	3%	1%	23%	7%	39%	22%	10%	-5%	2%	0%	-13%	9%	-6%	12%	100%	23%	2%	55%	30%	17%
BOVE...	32%	18%	-3%	-3%	17%	29%	3%	1%	31%	-2%	6%	4%	4%	2%	-2%	5%	3%	5%	3%	-2%	23%	100%	5%	11%	3%	22%
JAPAN...	19%	10%	2%	-2%	-21%	20%	-3%	-4%	19%	-4%	-1%	-1%	7%	2%	-33%	-2%	-5%	-13%	-1%	4%	2%	5%	100%	-1%	3%	48%
MSCI ...	0%	21%	4%	0%	13%	-1%	-5%	5%	-1%	25%	57%	42%	3%	-7%	6%	2%	-18%	12%	-1%	28%	55%	11%	-1%	100%	38%	8%
MSCI ...	1%	7%	5%	-0%	4%	1%	-5%	-0%	1%	11%	60%	76%	23%	-11%	1%	4%	-31%	6%	-20%	8%	30%	3%	3%	38%	100%	5%
NIKKEI...	40%	28%	5%	-2%	1%	39%	3%	-1%	40%	-1%	7%	0%	1%	-2%	-20%	2%	-3%	4%	-2%	0%	17%	22%	48%	8%	5%	100%
RTSI - ...	7%	18%	5%	-2%	9%	5%	-4%	5%	6%	34%	44%	37%	-3%	0%	3%	2%	-18%	10%	2%	19%	35%	17%	-3%	44%	30%	10%
RUSSI...	-15%	-7%	0%	1%	-29%	-13%	-2%	-4%	-14%	-5%	-2%	-3%	6%	-4%	-11%	-1%	-2%	-17%	-5%	-1%	-8%	-17%	-4%	-3%	0%	-10%

To view the correlation matrix of your portfolio, go to Data Settings and tick the "Include All Positions".



Then the Filter tab to filter for a specific fund or part of your portfolio, however if no filter is selected the correlations of all positions in your fund universe will be shown. Use the threshold exclude/include filter for specific correlation ranges only. To export the correlation matrix to Excel, simply click on the Excel  marker in the upper left corner.

To change the sampling and date range used for the correlation matrix, use the Calc Type settings drop down.

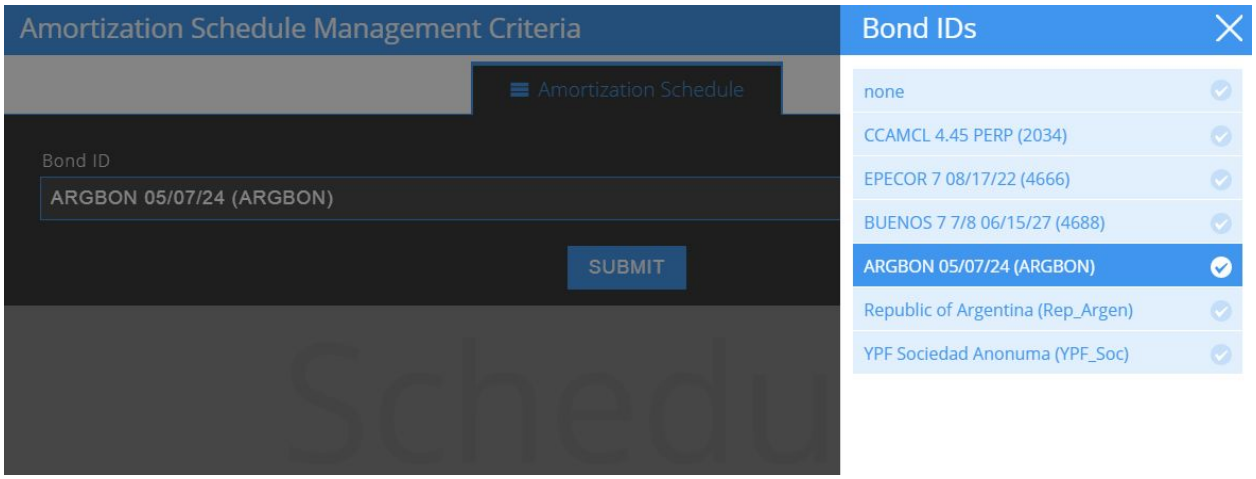
5.0. Exclusions Management

The exclusions tool allows you to set up criteria to exclude certain parts of your portfolio.

6.0. Managing Amortizing Bonds

Tungsten allows you to calculate sensitivities on amortizing bonds. As PMA does not store the amortization schedule we need to add it to Tungsten manually. This can be done with the Amortization Schedule editor found on the main menu page:

As usual go to Data Settings in upper right corner :



You will be presented with the Bond ID drop down. Click on the drop down and you should see the bonds that are setup as amortizing bonds. Pick the one you wish to add a schedule to.

Next add the schedule on the left hand side using the date picker or simply typing in the date (mm/dd/yyyy) and set the %age of amortization at each date. Make sure the dates match the pay dates of the bond. Click the Add + button to add a new line to edit.

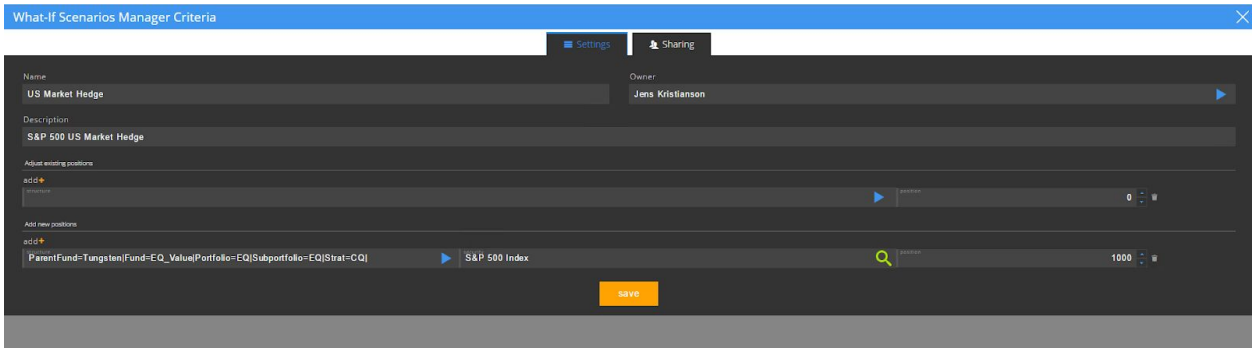
Once done and you hit save the system should calculate the cash flows going forward. Please note this only works if you have a position in the bond.Once you are satisfied with the result the bond should produce accurate bond sensitivity data.

7.0. What if Management

The What If management functionality allows you to enter trades into the system before you have traded them in the market. This gives us the ability to check the effect of a hedge or addition of positions in terms of VaR or in stressed conditions. The concept works as follows. First create a What if portfolio containing positions following your portfolio structure. You can add your hedge for example to the "hedge" strategy. You can use either securities that are already set up in Tradar PMS, alternatively you can use the Lodestar security universe (part of market data service). This gives you access to worldwide equities, indexes, commodities, currencies and bonds.

7.1.0 Setting up a new What If Portfolio

Opening the What If menu you see the list of already defined What If portfolio's. These can be edited or deleted. To create a new What If portfolio, simply click the "Add What If" in the upper right corner.



You will be presented with the What If portfolio editor:

Give the portfolio a name and description. Then add your positions to your portfolio structure by clicking the Add+ drop down. This will open up the structure as defined in Tradar PMS. Simply click along to define where the position should be located in the portfolio hierarchy.

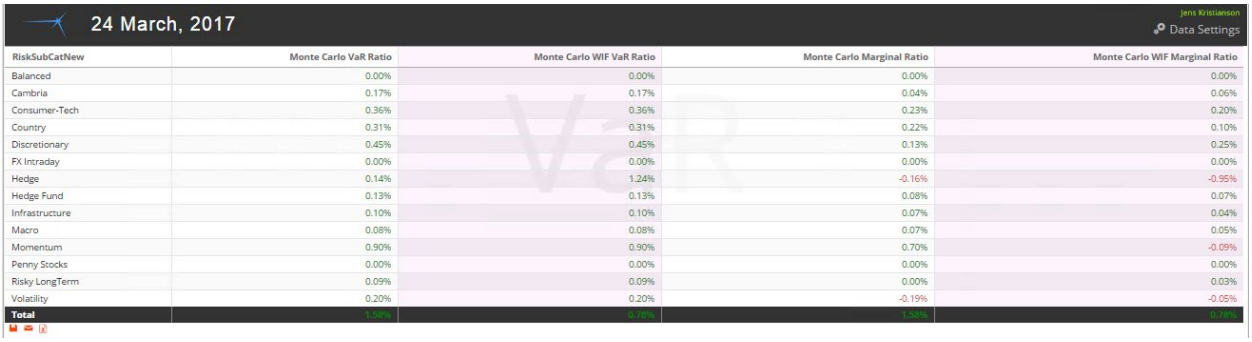
The first section picks securities already defined in Tradar PMS and the lower section (as filled in above) picks securities from the Lodestar market data universe. Once the drop down is opened, simply start typing the security name and the system should start searching through the list of securities.

Next, select the position size. If you want to add say 5,000,000 USD short S&P 500, enter 2000 position (assuming S&P 500 is trading at roughly 2,500). At the time of writing your imaginary position would be in the cash index and it is not contract based as the futures market.

Once this is done, you can share your What-If portfolio with other users in the system if you so wish. Click Save.

To check the effect of the What If portfolio, open up VAR or Scenario analysis tools.

In the example below we have increased the hedge in our sample portfolio and run it through the VAR analysis:



24 March, 2017

Jens Kristianson
Data Settings

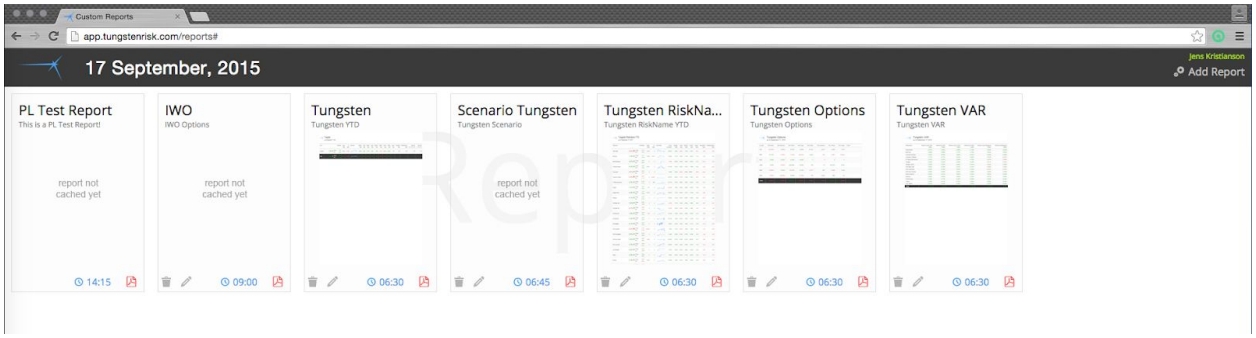
RiskSubCatNew	Monte Carlo VaR Ratio	Monte Carlo WIF VaR Ratio	Monte Carlo Marginal Ratio	Monte Carlo WIF Marginal Ratio
Balanced	0.00%	0.00%	0.00%	0.00%
Cambria	0.17%	0.17%	0.04%	0.06%
Consumer-Tech	0.36%	0.36%	0.23%	0.20%
Country	0.31%	0.31%	0.22%	0.10%
Discretionary	0.45%	0.45%	0.13%	0.25%
FX Intraday	0.00%	0.00%	0.00%	0.00%
Hedge	0.14%	1.24%	-0.16%	-0.95%
Hedge Fund	0.13%	0.13%	0.08%	0.07%
Infrastructure	0.10%	0.10%	0.07%	0.04%
Macro	0.08%	0.08%	0.07%	0.05%
Momentum	0.90%	0.90%	0.70%	-0.09%
Penny Stocks	0.00%	0.00%	0.00%	0.00%
Risky LongTerm	0.09%	0.09%	0.00%	0.03%
Volatility	0.20%	0.20%	-0.19%	-0.05%
Total	1.58%	0.78%	1.58%	0.78%

The area highlighted in purple is the effect of the portfolio with the new position. As we can see in this case, the overall VAR decreased dramatically from 1.58% risk to 0.78%. We can see the Hedge working it's magic, the Hedge part went up in VAR from 0.14% to 1.24%. We can see this has a risk reducing effect on the portfolio as the marginal VAR is showing -0.95% (up from -0.14% before hedge).

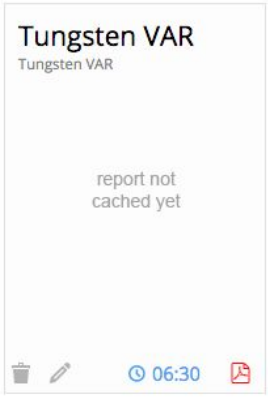
8.0. Reporting

Reports can be defined and will be based on any view that you have saved. Reports can be scheduled and sent as email to select users.

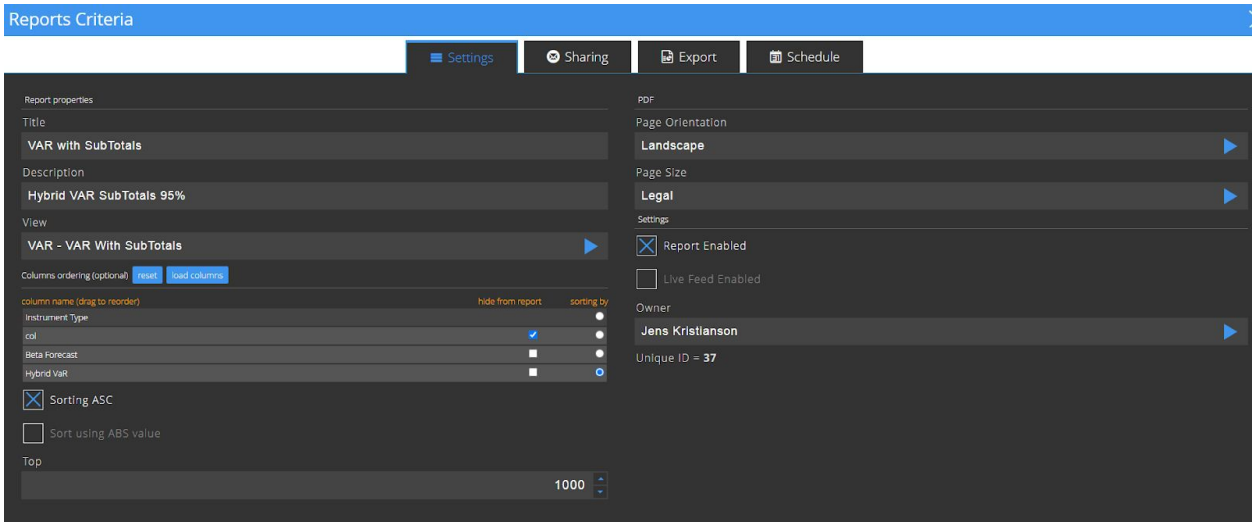
From the main menu, select the Reports menu next to the Data Viewers. You will be presented with your universe of reports (at first use this will be a blank page).



The Icon's on the bottom of the report should be self explanatory, but for clarity they are as follows from left to right: Delete report, Edit report, Schedule time of report, and view PDF.

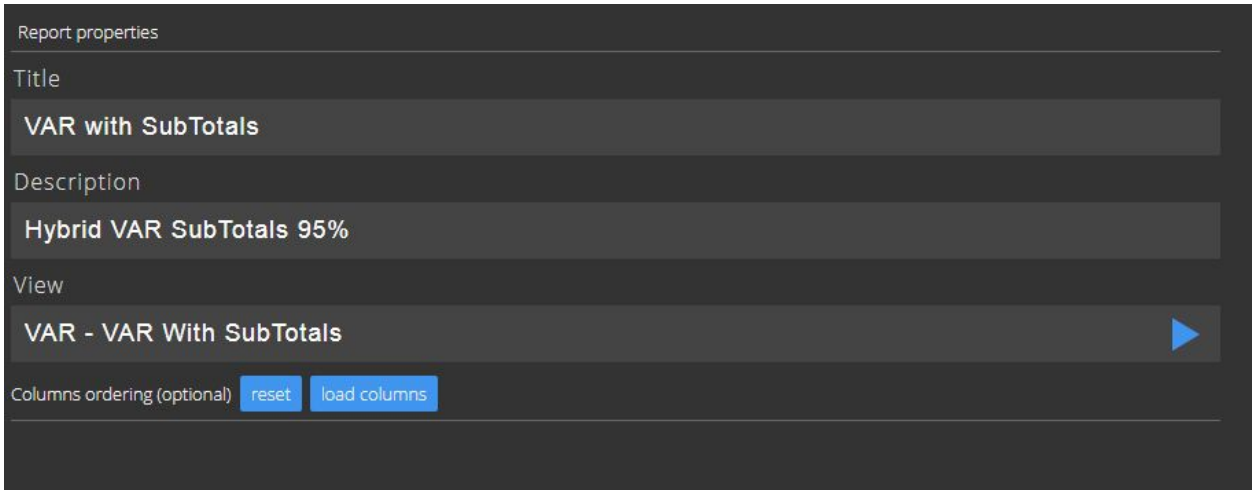


To define a new report, go to Add Report in the upper right corner.

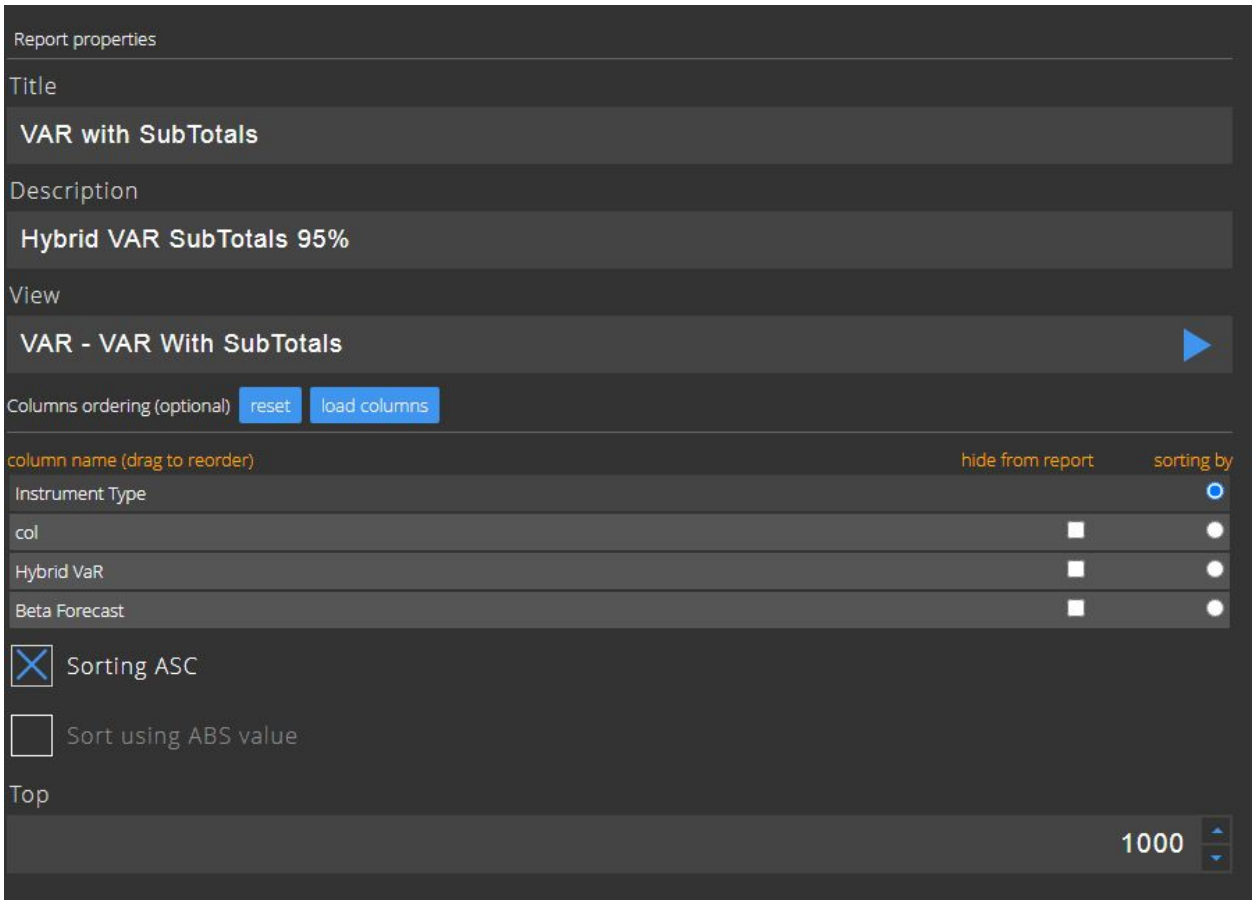


You will be presented with four tabs - Settings, Sharing, Export and Schedule. In the settings tab you define the Title and Description of your report. Select from the drop down of your pre-saved views that should define the data of your report.

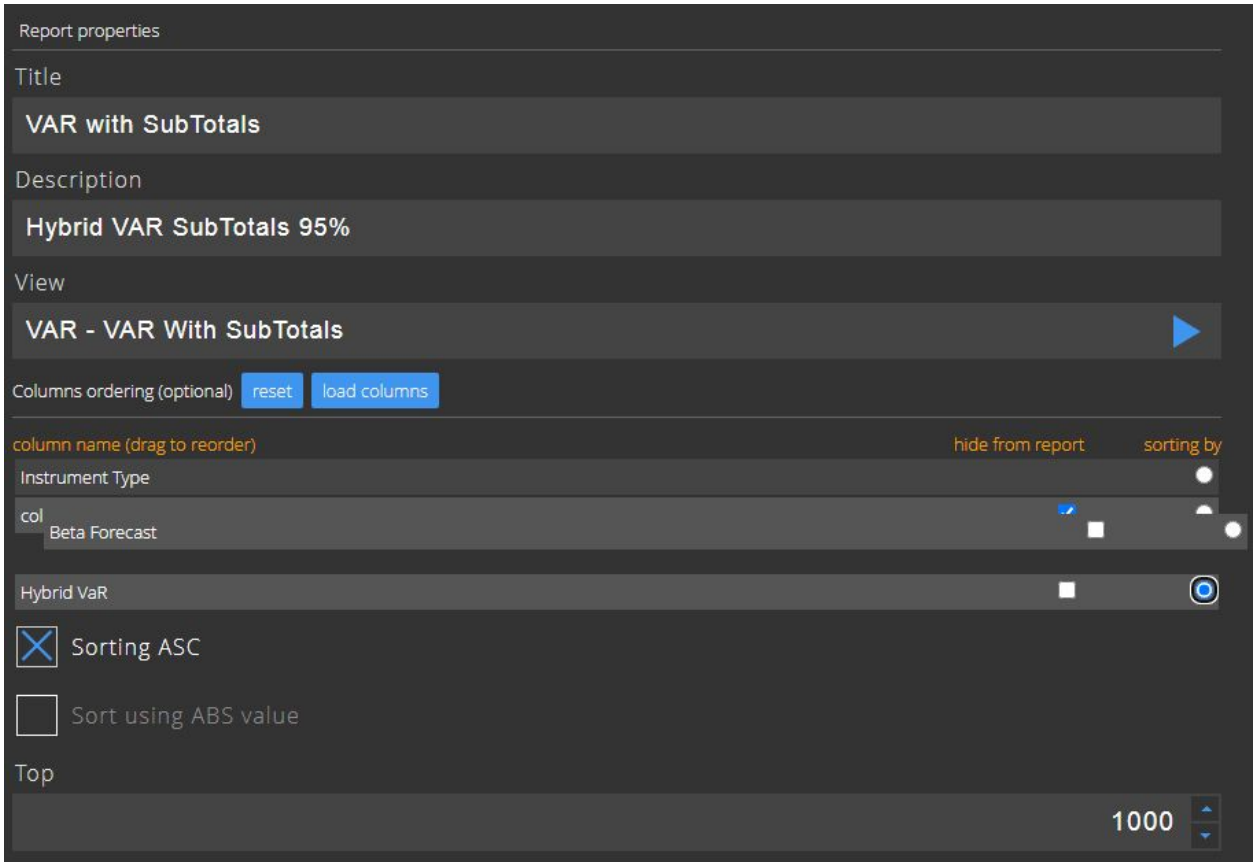
Once this is set you can pick the size of the paper (Letter, Legal), and the orientation (Landscape, Portrait). From the settings tab it is also possible to pick how the report should be sorted, and pick what columns should be displayed and hidden. Lastly you can move the columns around. Note: You need to first Save the report before you can access the columns.



Once report is saved click the load columns to display the columns:

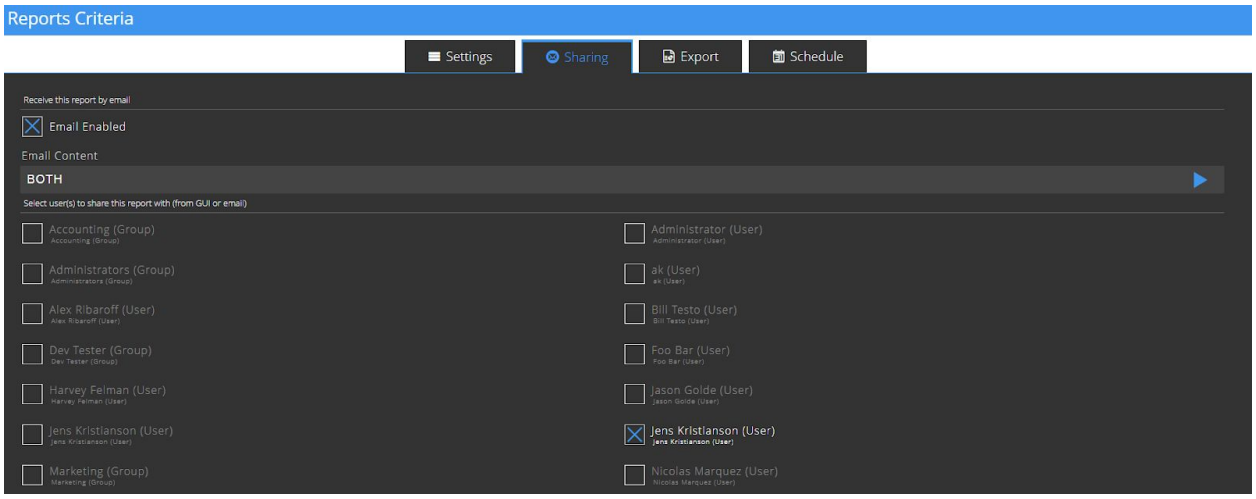


Click on the column you want to be sorted. The columns can be sorted in ascending or descending order by clicking on the Sorting ASC.



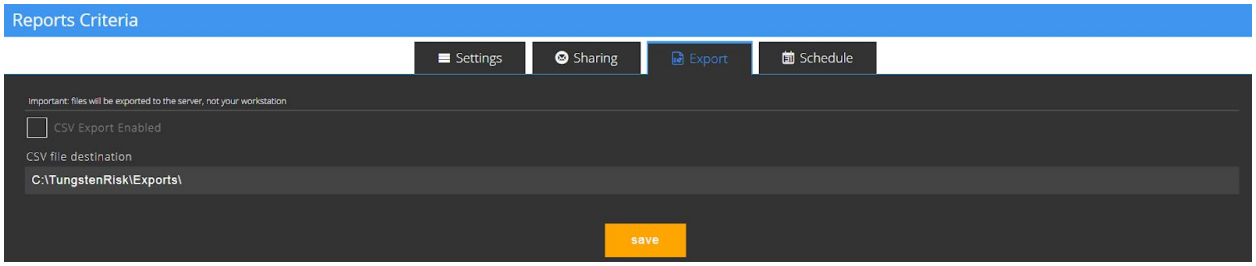
It is also possible to drag the columns around - simply click on the column and drag to a different location.

Lastly the Top selector allows you to only show the Top X rows of data. By default this is set to 1,000 so all data will be shown. But this could be set to say 5 so you can see the top 5 VAR contributors for example.

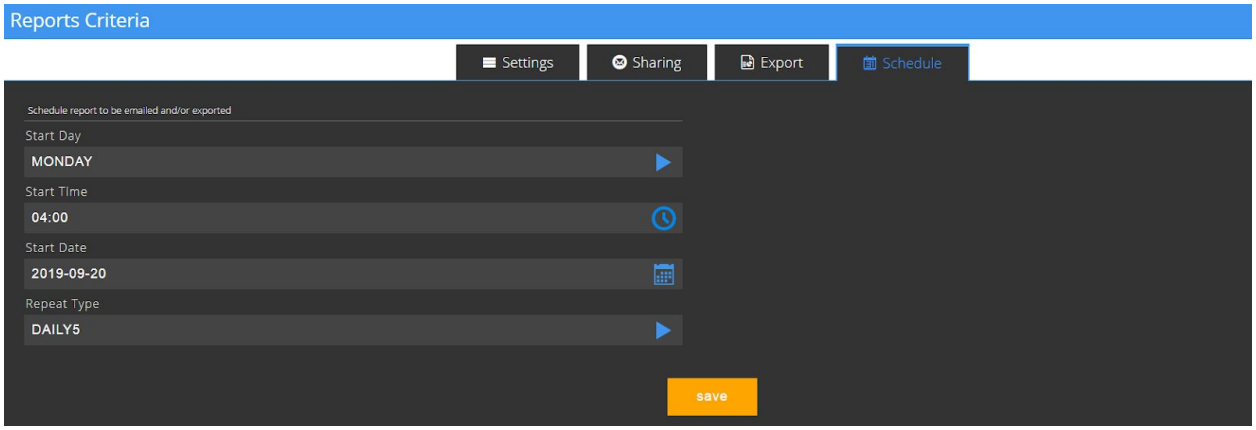


In the Sharing tab you define who this report should be shared with if any. Important: Regardless if you want to share it with another user or not, it is important at a minimum to select to share it with the owner of the report. This will ensure you will receive the report in your email at the scheduled appointed time.

In the Export tab you can tell the system if the data should be exported to a CSV file to any location on your network:



In the Schedule tab you define the schedule of report delivery.



Set the start date of the schedule, normally this would be Monday. The repeat time is the server's local time, and lastly the repeat type tells us the frequency the reports should be sent out, i.e. the most common one Daily5 means every weekday, Daily7 all calendar days of the week, Monthly is every month, Weekend only on weekend and Weekly once per week (this is driven off the Start Day, so if you wish to send out a Friday Report, Weekly, you would set Start Day to Friday and Repeat Type Weekly.

Note: you need to make sure the SMTP settings are correctly set up on your server where Tungsten Server service is running in order to receive risk reports to your mailbox.

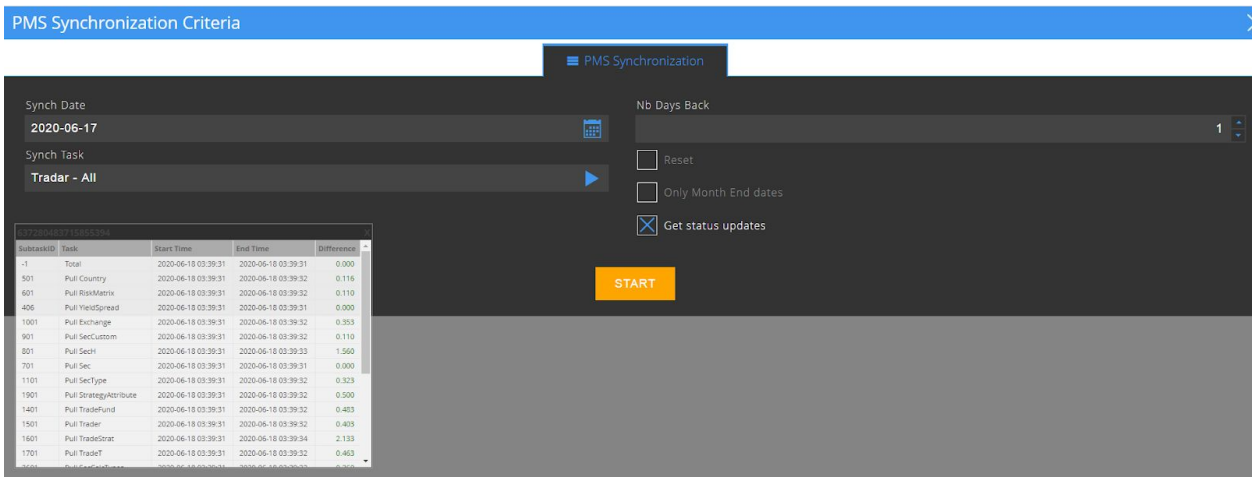
10.0. Data Synchronization

Moving over to the Tools part, we have Data Synchronization and Data Analyzer. The data synchronization allows you to sync your Tungsten database with Tradar PMS data.

There are several parts you can synchronize individually, or you can simply select Tradar - All that will do all necessary synchronization for you.

With the Nb Days Back you select the number of days from the selected date you want to sync. The process will run each weekday for the amount of days you select.

The Reset tells the system to get all data and not only changes since last synchronization. This takes longer time but can be good to do if there is data that is having trouble getting synced properly. Only run a sync with reset ticked for one day only.

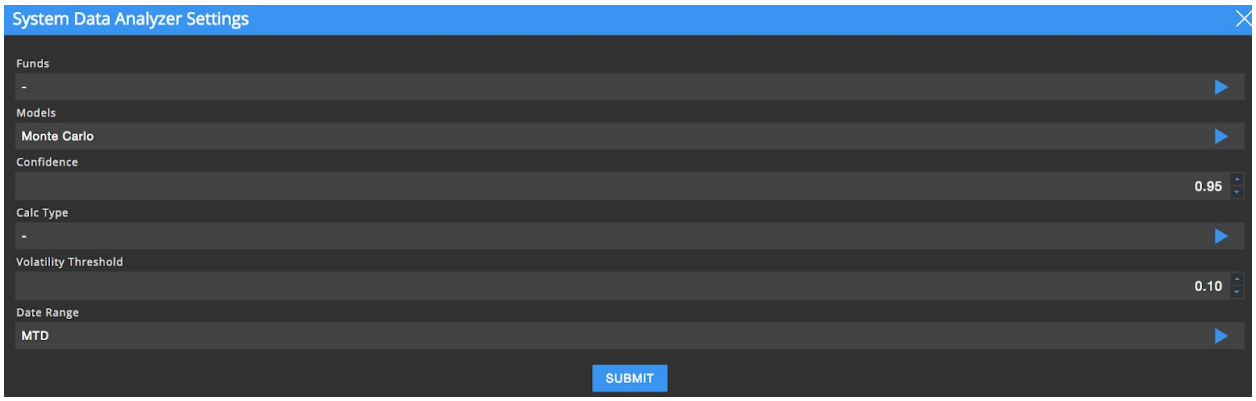


The Get Status Updates option gives us a pop up window onec the sync starts that will give us information on each step of the sync process. This can be useful to select if you want to see what's being synced and how long each step takes. The time is reported in seconds.

The "Only Month End Dates" selector allows us to sync only month end data - this can be good to do if there are total return differences in PMA vs Tungsten. Note: Tungsten does much of the synching in the background throughout the day - also on weekends the Tradar-All sync is done for the last 30 calendar days, plus all month end data since inception.

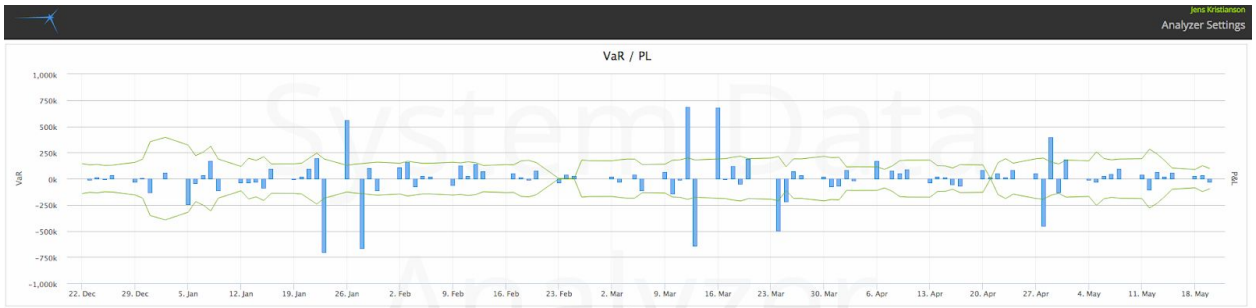
11.0. Data Analyzer

The data analyzer is a new and important tool. With this tool you can analyze the quality of your time series data. As the time series data is the input to most of the models, it is important that the data is accurate.



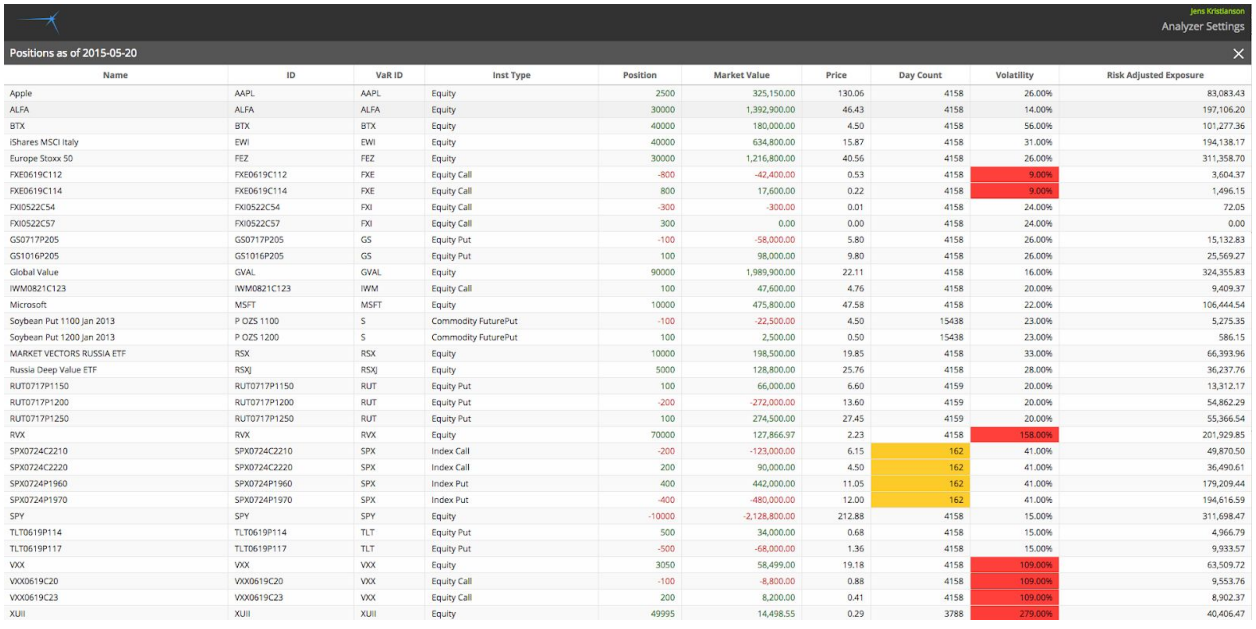
The first step is to select a fund to analyze - this narrows down the asset universe. Secondly we need to specify the calc type to use. The calc types are user defined - by default the calc types are set to 730 days of sampling, with daily frequency and no decay. 730 days weekly sampling and 730 days and monthly sampling.

Next set a volatility threshold for highlighting low volatility assets. Lastly, the date range is used for the back test range. Note: the longer range you take, the longer the process will take to run as it has to recalculate the risk forecast for each date. Below is an illustration. The blue bars are the daily returns and the green line is the VaR estimate.



Date	Average Day Count	Expected	Ratio Day Count	Positions with vol < 10% and > 100%	Total Positions	Ratio Positions
2014-12-22	4730	1460	324%	9	31	29%
2014-12-23	4731	1460	324%	9	31	29%
2014-12-24	4732	1460	324%	9	31	29%
2014-12-25	4733	1460	324%	9	31	29%
2014-12-26	4734	1460	324%	9	31	29%
2014-12-29	4760	1460	326%	10	30	33%
2014-12-30	4787	1460	328%	9	29	31%
2014-12-31	4845	1460	332%	8	27	30%

Below the VaR backtest we see another two charts - Low/High volatilities that main aim is to highlight where there are volatility spikes. The day count chart shows on average how many days of data there is for all assets for each date. Below the charts we have a detailed grid. The expected column shows us the amount of days we expect to see for the calc type we are using. In this case, we have more than enough data on average.

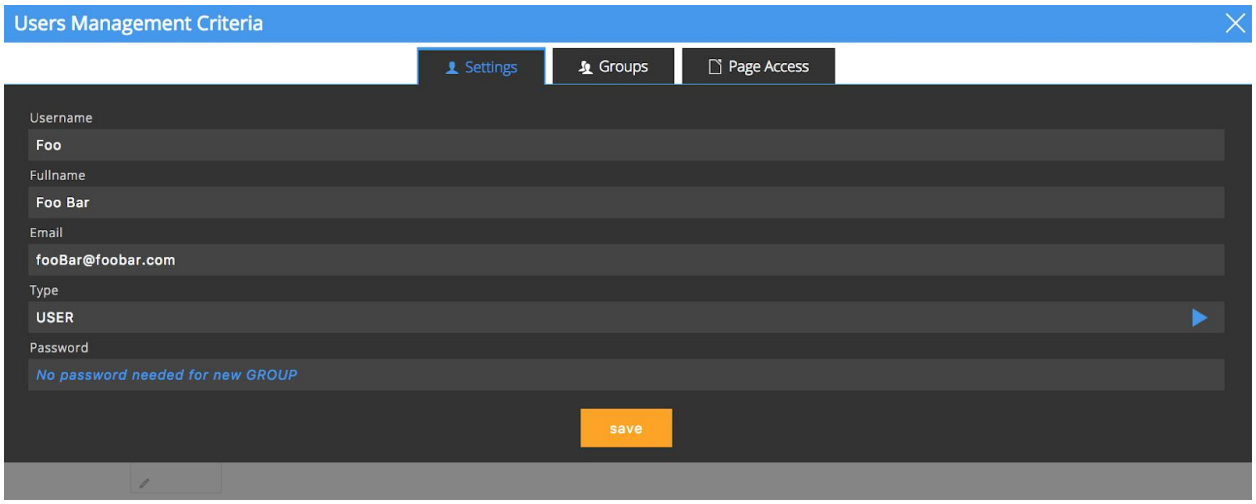


Name	ID	VaR ID	Inst Type	Position	Market Value	Price	Day Count	Volatility	Risk Adjusted Exposure
Apple	AAPL	AAPL	Equity	2500	325,150.00	130.06	4158	26.00%	83,083.43
ALFA	ALFA	ALFA	Equity	30000	1,392,900.00	46.43	4158	14.00%	197,106.20
BTX	BTX	BTX	Equity	40000	180,000.00	4.50	4158	56.00%	101,277.36
iShares MSCI Italy	EWI	EWI	Equity	40000	634,800.00	15.87	4158	31.00%	194,138.17
Europe Stoxx 50	FEZ	FEZ	Equity	30000	1,216,800.00	40.56	4158	26.00%	311,358.70
FXE0619C112	FXE0619C112	FXE	Equity Call	-800	-42,400.00	0.53	4158	9.00%	3,604.37
FXE0619C114	FXE0619C114	FXE	Equity Call	800	17,600.00	0.22	4158	9.00%	1,496.15
FXI0522C54	FXI0522C54	FXI	Equity Call	-300	-300.00	0.01	4158	24.00%	72.05
FXI0522C57	FXI0522C57	FXI	Equity Call	300	0.00	0.00	4158	24.00%	0.00
GS0717P205	GS0717P205	GS	Equity Put	-100	-58,000.00	5.80	4158	26.00%	15,132.83
GS1016P205	GS1016P205	GS	Equity Put	100	98,000.00	9.80	4158	26.00%	25,569.27
Global Value	GVAL	GVAL	Equity	90000	1,989,900.00	22.11	4158	16.00%	324,355.83
IWM0821C123	IWM0821C123	IWM	Equity Call	100	47,600.00	4.76	4158	20.00%	9,409.37
Microsoft	MSFT	MSFT	Equity	10000	475,800.00	47.58	4158	22.00%	106,444.54
Soybean Put 1100 Jan 2013	P OZS 1100	S	Commodity FuturePut	-100	-22,500.00	4.50	15438	23.00%	5,275.35
Soybean Put 1200 Jan 2013	P OZS 1200	S	Commodity FuturePut	100	2,500.00	0.50	15438	23.00%	586.15
MARKET VECTORS RUSSIA ETF	RSX	RSX	Equity	10000	198,500.00	19.85	4158	33.00%	66,393.96
Russia Deep Value ETF	RSXJ	RSXJ	Equity	5000	128,800.00	25.76	4158	28.00%	36,237.76
RUT0717P1150	RUT0717P1150	RUT	Equity Put	100	66,000.00	6.60	4159	20.00%	13,312.17
RUT0717P1200	RUT0717P1200	RUT	Equity Put	-200	-272,000.00	13.60	4159	20.00%	54,862.29
RUT0717P1250	RUT0717P1250	RUT	Equity Put	100	274,500.00	27.45	4159	20.00%	55,366.54
RVX	RVX	RVX	Equity	70000	127,866.97	2.23	4158	158.00%	201,929.85
SPX0724C2210	SPX0724C2210	SPX	Index Call	-200	-123,000.00	6.15	162	41.00%	49,870.50
SPX0724C2220	SPX0724C2220	SPX	Index Call	200	90,000.00	4.50	162	41.00%	36,490.61
SPX0724P1960	SPX0724P1960	SPX	Index Put	400	442,000.00	11.05	162	41.00%	179,209.44
SPX0724P1970	SPX0724P1970	SPX	Index Put	-400	-480,000.00	12.00	162	41.00%	194,616.59
SPY	SPY	SPY	Equity	-10000	-2,128,800.00	212.88	4158	15.00%	311,698.47
TLT0619P114	TLT0619P114	TLT	Equity Put	500	34,000.00	0.68	4158	15.00%	4,966.79
TLT0619P117	TLT0619P117	TLT	Equity Put	-500	-68,000.00	1.36	4158	15.00%	9,933.57
VXX	VXX	VXX	Equity	3050	58,499.00	19.18	4158	109.00%	63,509.72
VXX0619C20	VXX0619C20	VXX	Equity Call	-100	-8,800.00	0.88	4158	109.00%	9,553.76
VXX0619C23	VXX0619C23	VXX	Equity Call	200	8,200.00	0.41	4158	109.00%	8,902.37
XUII	XUII	XUII	Equity	49995	14,498.55	0.29	3788	279.00%	40,406.47

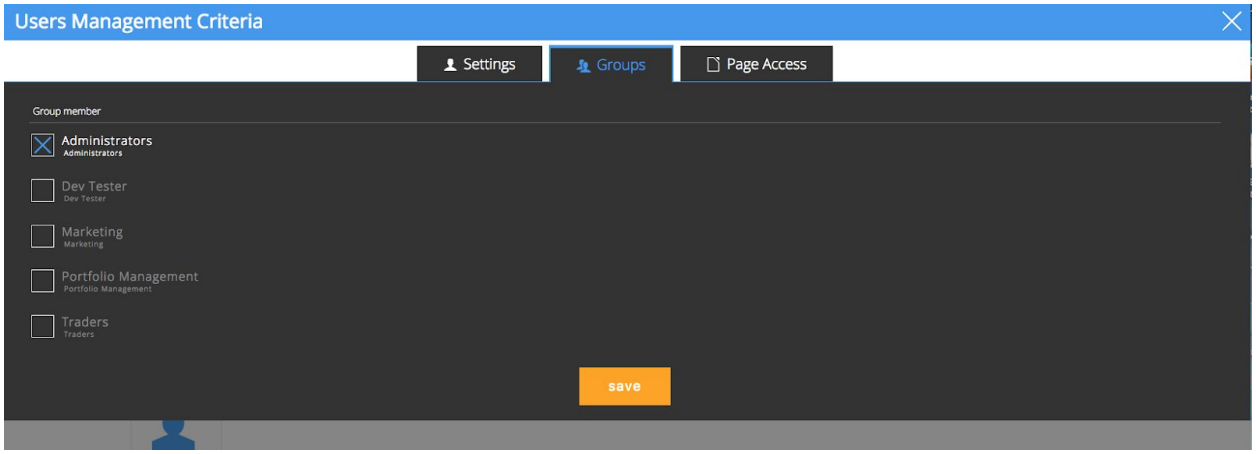
If you double click on the main back test chart you can drill down to position detail level. On this grid all positions that fall outside of our pre-defined boundaries will be highlighted. In the example below we can see that FXE option volatility is 9%. This may be correct, however it is failing outside of our < 10% threshold we specified. Similarly the day count for the SPX options show there appear to be too little historic data available for the SPX index (yellow showing 162 days, but we expect 1460). The RVX position has quite a high volatility showing 158%. The user obviously needs to have quite a good idea on his portfolio when analyzing this data as something highlighted in red does not necessarily mean it is bad.

12.0 User Management

Use the user management to set up new users for the Tungsten Sabre GUI. Select Add user and then enter user details as depicted below.



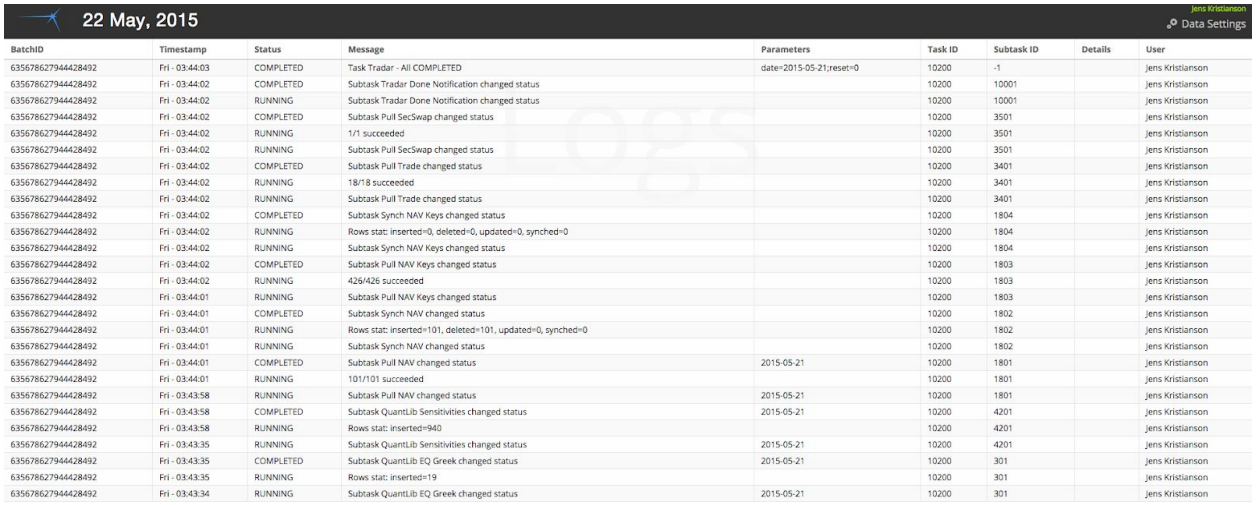
Select USER type and enter a password. Please make sure the user belongs to a group in the Group tab.



Once done, Save the user and try to login with the new user from another Sabre session. There are no limits to how many users you can set up.

13.0. Logs

The logs viewer gives us access to the system log. Use this log page to check if there are any problems with any synch's or issues with calculations. You can sort by clicking on the headers.



BatchID	Timestamp	Status	Message	Parameters	Task ID	Subtask ID	Details	User
635678627944428492	Fri - 03:44:03	COMPLETED	Task Tradar - All COMPLETED	date=2015-05-21;reset=0	10200	-1		Jens Kristianson
635678627944428492	Fri - 03:44:02	COMPLETED	Subtask Tradar Done Notification changed status		10200	10001		Jens Kristianson
635678627944428492	Fri - 03:44:02	RUNNING	Subtask Tradar Done Notification changed status		10200	10001		Jens Kristianson
635678627944428492	Fri - 03:44:02	COMPLETED	Subtask Pull SecSwap changed status		10200	3501		Jens Kristianson
635678627944428492	Fri - 03:44:02	RUNNING	1/1 succeeded		10200	3501		Jens Kristianson
635678627944428492	Fri - 03:44:02	RUNNING	Subtask Pull SecSwap changed status		10200	3501		Jens Kristianson
635678627944428492	Fri - 03:44:02	COMPLETED	Subtask Pull Trade changed status		10200	3401		Jens Kristianson
635678627944428492	Fri - 03:44:02	RUNNING	18/18 succeeded		10200	3401		Jens Kristianson
635678627944428492	Fri - 03:44:02	RUNNING	Subtask Pull Trade changed status		10200	3401		Jens Kristianson
635678627944428492	Fri - 03:44:02	COMPLETED	Subtask Synch NAV Keys changed status		10200	1804		Jens Kristianson
635678627944428492	Fri - 03:44:02	RUNNING	Rows stat: inserted=0, deleted=0, updated=0, synched=0		10200	1804		Jens Kristianson
635678627944428492	Fri - 03:44:02	RUNNING	Subtask Synch NAV Keys changed status		10200	1804		Jens Kristianson
635678627944428492	Fri - 03:44:02	COMPLETED	Subtask Pull NAV Keys changed status		10200	1803		Jens Kristianson
635678627944428492	Fri - 03:44:02	RUNNING	426/426 succeeded		10200	1803		Jens Kristianson
635678627944428492	Fri - 03:44:01	RUNNING	Subtask Pull NAV Keys changed status		10200	1803		Jens Kristianson
635678627944428492	Fri - 03:44:01	COMPLETED	Subtask Synch NAV changed status		10200	1802		Jens Kristianson
635678627944428492	Fri - 03:44:01	RUNNING	Rows stat: inserted=101, deleted=101, updated=0, synched=0		10200	1802		Jens Kristianson
635678627944428492	Fri - 03:44:01	RUNNING	Subtask Synch NAV changed status		10200	1802		Jens Kristianson
635678627944428492	Fri - 03:44:01	COMPLETED	Subtask Pull NAV changed status	2015-05-21	10200	1801		Jens Kristianson
635678627944428492	Fri - 03:44:01	RUNNING	101/101 succeeded		10200	1801		Jens Kristianson
635678627944428492	Fri - 03:43:58	RUNNING	Subtask Pull NAV changed status	2015-05-21	10200	1801		Jens Kristianson
635678627944428492	Fri - 03:43:58	COMPLETED	Subtask QuantLib Sensitivities changed status	2015-05-21	10200	4201		Jens Kristianson
635678627944428492	Fri - 03:43:58	RUNNING	Rows stat: inserted=940		10200	4201		Jens Kristianson
635678627944428492	Fri - 03:43:35	RUNNING	Subtask QuantLib Sensitivities changed status	2015-05-21	10200	4201		Jens Kristianson
635678627944428492	Fri - 03:43:35	COMPLETED	Subtask QuantLib EQ Greek changed status	2015-05-21	10200	301		Jens Kristianson
635678627944428492	Fri - 03:43:35	RUNNING	Rows stat: inserted=19		10200	301		Jens Kristianson
635678627944428492	Fri - 03:43:34	RUNNING	Subtask QuantLib EQ Greek changed status	2015-05-21	10200	301		Jens Kristianson