

A StockOpter® *Insight* White Paper
From: Net Worth Strategies. Inc.

Value at Risk (VaR)

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This document discusses what Value at Risk (VaR) is and how it is calculated.

VaR Defined

Value at Risk is a measure of how large a loss one might incur due to market movements over some time frame at some confidence level. The time frame is typically one business day, but StockOpter *Insight* uses one month, as we felt that this would be more meaningful to our users. The confidence level is typically 95%, 97.5%, or 99%; StockOpter *Insight* uses 95%.

Thus, StockOpter *Insight's* VaR is the 5th percentile result, i.e., the result for which the probability of doing worse is 5% and the probability of doing better is 95%. It is important to note that these percentiles are of *all* results, not just losses. For example, if the probability of sustaining a loss is 50%, the chance of a loss being greater than the VaR *given that there is a loss* is 5%/50%, or 10%.

How VaR is Calculated in General

VaR is typically calculated for portfolios consisting of assets subject to multiple risk factors, such as various interest rates, foreign exchange rates, equity prices, and/or commodity prices. The value of an individual asset will often depend mostly on one dominant risk factor, but different assets in the same portfolio will often have different dominant risk factors. This makes calculating VaR quite difficult, due to the correlations between different risk factors. Historical simulation, Monte Carlo simulation, or other sophisticated techniques are generally required.

How VaR is Calculated in StockOpter *Insight*

Calculating VaR in StockOpter *Insight* is much easier than the general case, due to the portfolio in question having only one dominant risk factor, namely the price of the stock of the company for which the option owner works. The other variables that might be varied, such as the risk-free interest rate, the volatility, and the dividend yield if the stock pays dividends, will have much

smaller effects, and as a result we hold them constant. Thus, all we have to do is note the value of the portfolio today, calculate the 5th percentile of the price in one month, substitute that for the current price, recalculate the value of the portfolio today, and calculate and show the difference in value of the portfolio.

Note that we are not aging the portfolio by one month. We have chosen not to do that, so that we do not have to deal with vesting dates and expiration dates due to occur in the next month. Thus, the VaR in *StockOpter Insight* is the loss that would occur if the stock price today were to instantly change to the 5th percentile of the possible prices one month from now.

As for how to calculate the 5th percentile of the possible stock prices one month from now, please see the White Papers on the "Lognormal random Walk" model for stock prices at www.NetWorthStrategies.com.