Intraday Support and Resistance—Using Volume-Weighted Average Price (VWAP)

By Frederic Palmliden, CMT

Senior Market Technician, TradeStation Labs
TSLabs@TradeStation.com

Summary:

This custom intraday Volume-Weighted Average Price (VWAP) indicator provides estimated current and historical intraday VWAP values. The indicator plots as many as the last four daily VWAPs, as well as the real-time VWAP on the current session of the analyzed security. The historical VWAPs can serve as support and resistance lines as the current session’s price action unfolds and can offer valuable information for traders. The intraday VWAP is reset at the beginning of each new trading session and the historical VWAP lines are color coded for visual differentiation of the age of each VWAP line.

Introduction:

VWAP is a ratio widely used in trading. It is based on the price of the security and its volume over a specified time period (usually one day). The numerator is the sum of the security’s price over the specified time period multiplied by the corresponding volume; the denominator is the total shares/contracts traded for the time period. The formula for the VWAP can be written as follows:

\[ P_{VWAP} = \frac{\sum_j P_j \cdot Q_j}{\sum_j Q_j} \]

where:

- \( P_{VWAP} \) = Volume Weighted Average Price
- \( P_j \) = price of trade \( j \)
- \( Q_j \) = quantity of trade \( j \)
- \( j \) = each individual trade that takes place over the defined period of time

Source: http://en.wikipedia.org/wiki/VWAP
VWAP has numerous applications in the trading world. It is often used in algorithmic trading, more specifically in volume-participation algorithms. For example, a broker may guarantee the execution of a trade at the VWAP price (known as a Guaranteed VWAP execution). A broker may also offer a VWAP target execution where the broker makes a best effort to execute near the VWAP.

VWAP is also used as a trading benchmark by investors who are not worried about the timing of the trade, but who are concerned about the adverse impact of their trades on the price of the security. The goal is to execute orders in-line with the volume of the market. Many pension funds and some mutual funds fall into this category.

The performance of passive traders is sometimes measured according to the VWAP. Long entry prices that are lower than the VWAP are considered favorable, while entries above the VWAP are considered unfavorable. These non-discretionary trades take place with a general disregard for timing. In this case, VWAP is used to calculate trading costs, since the average entry price would be compared to the VWAP benchmark price. This is the main reason why some argue that using the VWAP as a target reduces transaction costs.

The VWAP calculation can take numerous other forms in practice. In addition to the standard definition above, traders may use VWAP excluding their own transactions, non-block VWAP, VWAP proxies when tick data is unavailable, and value-weighted average for volatile markets in which prices weighted by dollar value of trade are used instead of share/contract volume.

VWAP can also be a useful tool for short-term discretionary traders and many different strategies can employ this measurement. One simple well-known strategy is to wait for the price to pierce through the VWAP to the upside when a long position is sought and when the trader is looking for buyers to regain control, since a breakout above VWAP may show upside momentum. The core idea is that the current VWAP and past VWAPs can act as potential support and resistance levels.

Most trading applications only show the current day’s VWAP. This is mainly because historical VWAPs require enormous amounts of data, since all the tick and volume data for the different sessions would need to be referenced. One solution is to approximate the historical VWAPs using 1-minute intraday data, cutting down dramatically on the amount of historical data needed. The resulting VWAPs are not exact, but are very close to the actual values.
Indicator Inputs:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TodaysVWAPColor</td>
<td>Red</td>
<td>Color used for the current intraday VWAP</td>
</tr>
<tr>
<td>YesterdaysVWAPCol</td>
<td>Blue</td>
<td>Color used for yesterday’s final VWAP value</td>
</tr>
<tr>
<td>TwoDaysAgoVWAPCol</td>
<td>Yellow</td>
<td>Color used for the final VWAP value of 2 days ago</td>
</tr>
<tr>
<td>ThreeDaysAgoVWAPCol</td>
<td>Cyan</td>
<td>Color used for the final VWAP value of 3 days ago</td>
</tr>
<tr>
<td>FourDaysAgoVWAPCol</td>
<td>Magenta</td>
<td>Color used for the final VWAP value of 4 days ago</td>
</tr>
</tbody>
</table>

Indicator Construction:

The current intraday VWAP is approximated using a 1-minute intraday chart and the formula listed in the beginning of this paper. The intraday VWAP is displayed using a red line (TodaysVWAPColor input). Depending on how much data is loaded into the chart, the maximum number of VWAPs that can be seen is five at any one time (current VWAP plus previous four daily VWAPs). The last four historical daily VWAPs are color coded using user-defined colors (YesterdaysVWAPCol, TwoDaysAgoVWAPCol, ThreeDaysAgoVWAPCol, and FourDaysAgoVWAPCol inputs) in order to identify how old each VWAP is no matter where on the chart you are looking.

The indicator recognizes whether pre- and/or post-market data is used for equities and the VWAP values are not reset after the pre-market session ends or when the post-market session starts. Therefore, if pre- and post-market data is used, each one of the five different VWAPs includes the data from its pre- and post-market session in the calculations. A 1-minute intraday interval is recommended to better estimate the VWAPs; however, depending on your willingness to accept a margin of error, you may want to experiment with slower intervals (i.e., 5 minutes). The indicator will be able to detect pre- and/or post-market equity data no matter which intraday interval is used (i.e., 5-minute intraday interval).
For additional information on the indicator construction, please refer to the comments inside the EasyLanguage® document.

After you have imported the indicator from the attached “.eld” file, you can use the workspace provided. Please look for “IntradayVWAPs” in your list of indicators to insert this indicator on a new chart.

Analysis:

Viewing this custom VWAP indicator on an intraday chart reveals that the different VWAP lines often act as resistance and support lines. A VWAP line that was acting as resistance often becomes support once penetrated, while a VWAP line acting as support often becomes resistance once penetrated. The different VWAP lines can also serve as target lines intraday when the price action is caught between lines.

As with any other technical analysis tool, the VWAP lines can work well at times and not so well at other times. A VWAP on stronger-than-average daily volume and/or different VWAPs near the same price may provide a higher probability of acting as potential support or resistance. It might also be interesting to use other technical analysis tools in conjunction with the VWAP lines in order to better discern which line might be providing a stronger support or resistance level.

As described in the Indicator Construction section, the indicator works with, or without pre- and/or post-market equity data. The indicator can be applied to any security where volume is accessible. For example, the indicator works with futures, such as the S&P E-mini futures contract. In that case, the indicator is able to recognize that 17:00 U.S. Central Time on Sunday is the opening time for Monday’s session and the VWAP is then reset on the first bar after 15:30 U.S. Central Time.

Conclusion:

This custom intraday VWAP indicator sheds light on an area of analysis that is often obscured by the inaccessibility of the needed data. Using intraday data of a short interval provides active traders with VWAP values accurate enough to be of practical use. The different VWAP lines often act as support and resistance lines for the considered security and can offer valuable information for traders.

Potential future versions of this indicator may include the flexibility to specify an exact time period to take into consideration for the VWAP calculations. In addition, inputs could be made available to create custom sessions to consider for the VWAP calculations. For example, maybe only the first and last hours of the regular session should be included in the VWAP calculation. Lastly, the width of the VWAP lines could be made to vary depending on the daily volume for additional visual assistance as to which line might be relatively more important. Stay tuned!
To use the files provided with this issue of Market Concepts:

- Files with extension '.eld' – These contain EasyLanguage documents: analysis techniques and strategies. Double-clicking on this file will start the Easy Language Import Wizard. Follow the prompts to completion. The analysis techniques or strategies will automatically be placed in the correct locations for your use in TradeStation. This should be done before opening any workspaces provided.
- Files with extension '.tsw' – These are TradeStation workspaces. These may be stored in any folder where you choose to save TradeStation workspaces.
- Files with extension '.txt' – These are text versions of the EasyLanguage documents and are generally used only by advanced EasyLanguage users.
- Other supporting documents or files may also be attached to the report.

All support, education and training services and materials on the TradeStation Securities website are for informational purposes and to help customers learn more about how to use the power of TradeStation software and services. No type of trading or investment advice is being made, given or in any manner provided by TradeStation Securities or its affiliates.

This material may also discuss in detail how TradeStation is designed to help you develop, test and implement trading strategies. However, TradeStation Securities does not provide or suggest trading strategies. We offer you unique tools to help you design your own strategies and look at how they could have performed in the past. While we believe this is very valuable information, we caution you that simulated past performance of a trading strategy is no guarantee of its future performance or success. We also do not recommend or solicit the purchase or sale of any particular securities or derivative products. Any symbols referenced are used only for the purposes of the demonstration, as an example ---- not a recommendation.

Finally, this material may discuss automated electronic order placement and execution. Please note that even though TradeStation has been designed to automate your trading strategies and deliver timely order placement, routing and execution, these things, as well as access to the system itself, may at times be delayed or even fail due to market volatility, quote delays, system and software errors, Internet traffic, outages and other factors.