

SciChart: Integration into Financial Analytics Application

Customer

Large Trading Company

Industry

Financial, Trading, Analytics

Skills involved

C#, WPF, Xaml

Notes

Performed as consultancy project.

Scope

- 1-2 SciChart Consultants
- Our team integrated to customer development team
- 1-Year duration of project (Ongoing)



About the company

The Client is a highly successful quantitative trading firm and global private investor.

The Client's focus is on technology and financial sector opportunities. Leveraging the unique understanding of risk management, they utilize complex quantitative research methods and leading-edge technology to develop world-class trading strategies.

The Client now actively trades in over 150 instruments on more than 25 exchanges multiple times a day utilizing co-location facilities in regional geographic hubs.

“It goes without saying the application needs to be performant to handle big datasets and have smooth user interactions.”

The motivation for a project

The Client had a need for a powerful, general-purpose charting control, which any of the client's application in the Windows environment should be able to use. In addition, there was a need for an application that will allow visualization of key trading related metrics using charts.

It goes without saying, the application needed to be performant enough to handle big datasets and have smooth user interactions.

The new application would be taking the core features from a discontinued Silverlight predecessor. However, the new application also incorporated new extended features.

Challenges

The past experience – using other third party chart controls in the past was mostly painful.

Big data and performance – the application needed to handle the trading information from over 150 markets across the globe, with over 20-years of intraday data history. This tool is used for analytics, so needs to perform well with huge datasets.

Interactivity – the application must have a fast startup time. Charts need to interact with the tree view and other parts of the whole application seamlessly. Charts should be able to handle interactions like zooming, panning, and scrolling smoothly, as well as rollovers and crosshairs should work easily.

Starting from scratch – as always when creating a new feature or a product it is important to keep it balanced, consistent and improve continuously so it serves its purpose well. In this case, the biggest stress is keeping the performance high while extending the functionality.

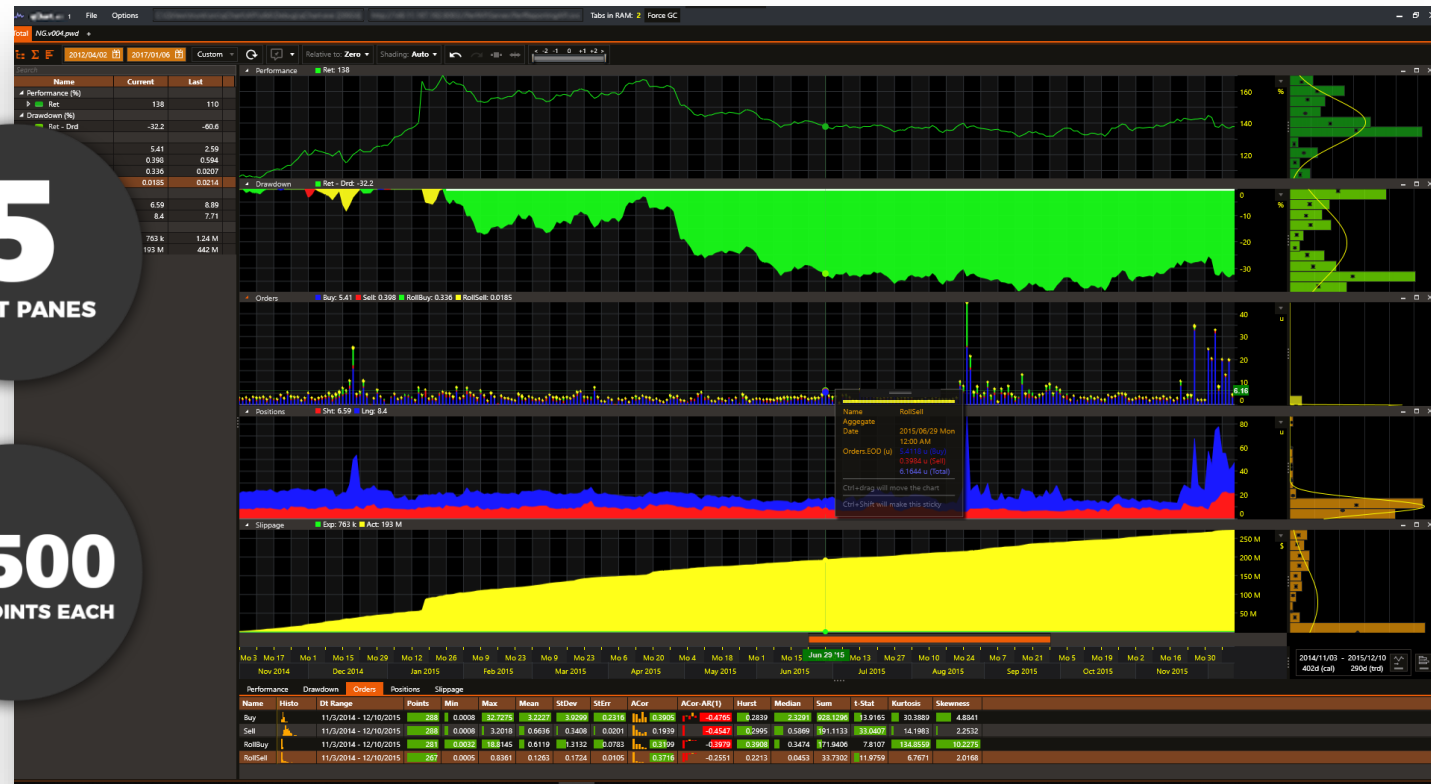
The initial integration of SciChart

The initial integration of SciChart to the application used our “out of the box” features, to provide the following to the client.

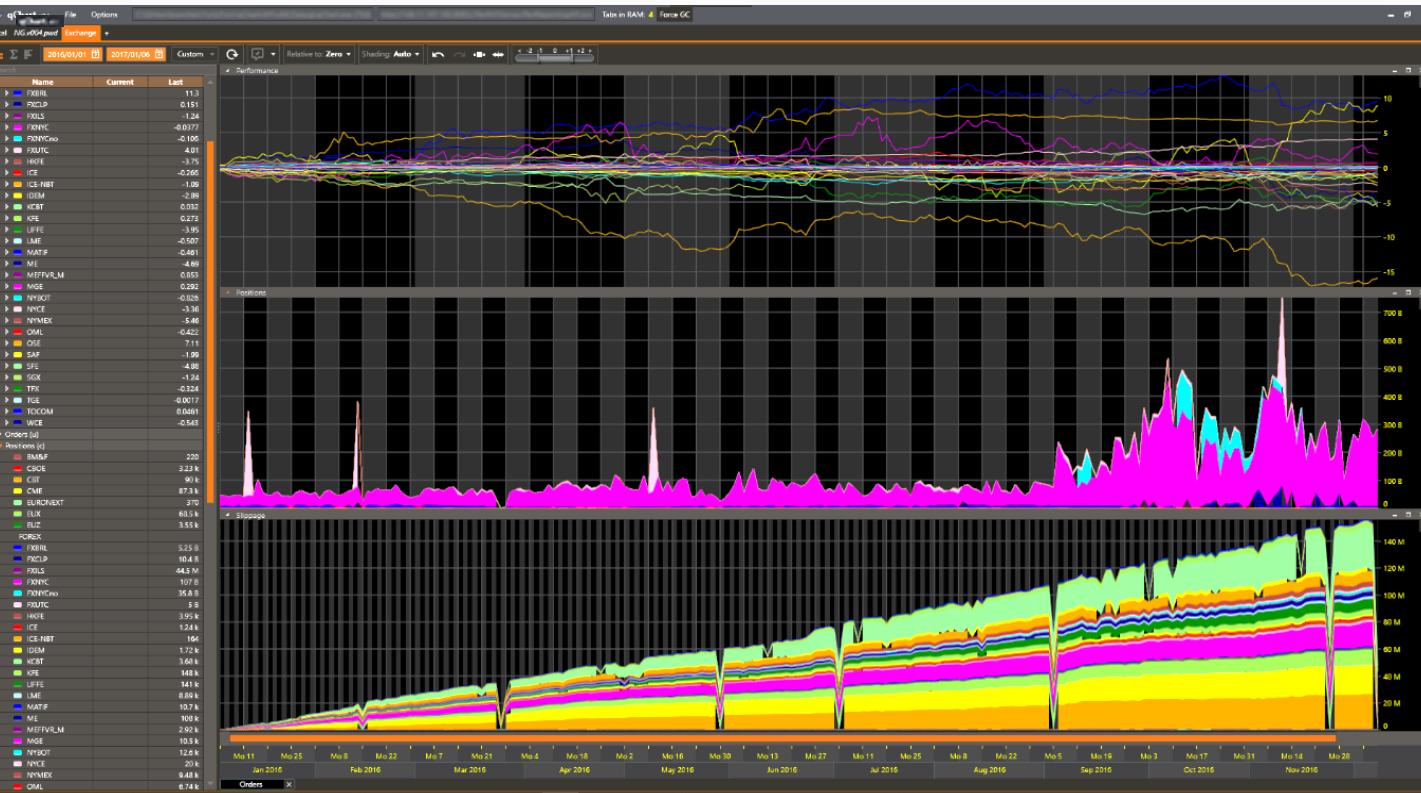
- **Various Chart types:** Visualization of data using Line charts, Mountain (or area) charts, column charts, Band charts, OHLC bars and impulse charts.
- **Crosshairs with tooltip and rollovers.**
- **Various Axis Types:** Date time and Discontinuous, Category and logarithmic axes.
- **Interactions with the chart:** Zooming and panning functionalities, as well as scroll bar with zoom history manager.
- **Annotations and interactions with them:** vertical and horizontal lines, line with arrow, text, a box with the Fibonacci retracement.
- **Hit test and selection.**

5
 CHART PANES

1,500
 DATAPPOINTS EACH



You can see from top to bottom – the line chart, mountain charts, stacked column chart; and DateTime Category axis and a cursor with tooltip on a chart

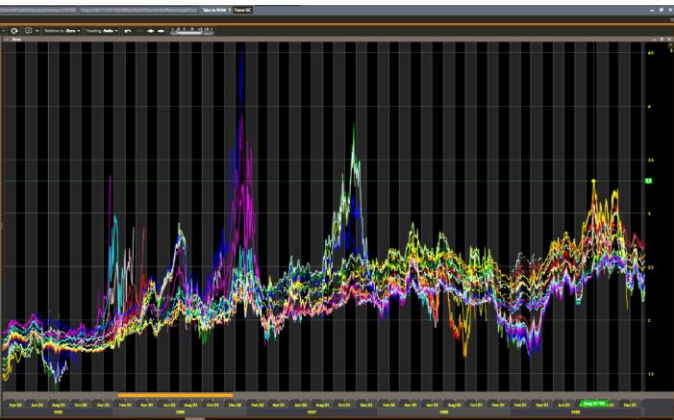


First pane has monthly shading set, second is weekly and the third one is set to daily.

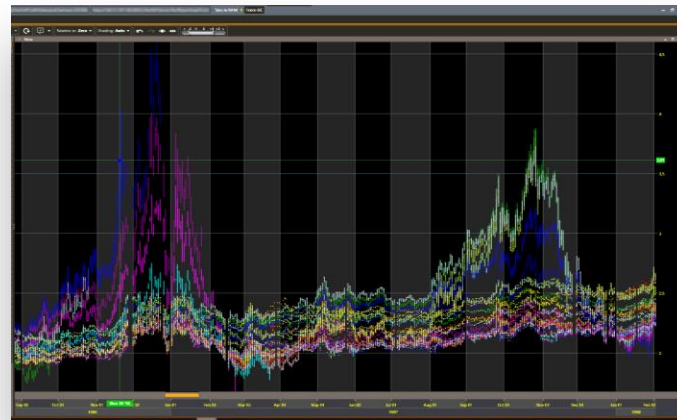
Custom SciChart Features

Custom features were also added to SciChart, as requested by the client. These included:

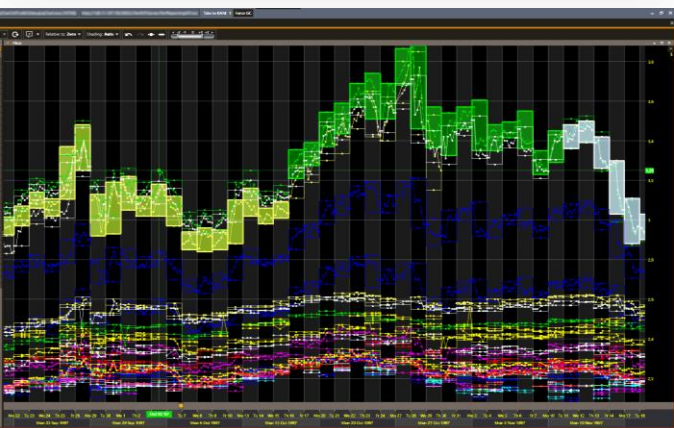
- **Custom double-scale discontinuous axis** – the client required an axis which allowed the changing axis bands (shading) frequency to hourly, daily, weekly, monthly, yearly.
- **Custom background shading** – the client required a customizable shading of bands in X and Y directions according to trading system intervals.
- **Stacked area chart with palette provider support** – the client required the stacked area chart to be divided into different colors vertically to indicate different trading strategies.
- **'Relative-to' option for cumulative charts** – the client required an option which allowed line charts to have their own scale (all lines to zoom to fit the viewport) or to be scale relative to one another. With this 'common scale' feature turned off both charts would fill the same height in the pane.
- **The customizable formatting of the y-axis** - the client required a right click menu that allows to choose the axis type as well as the way the numbers are formatted on the axis (in thousands, millions etc.)



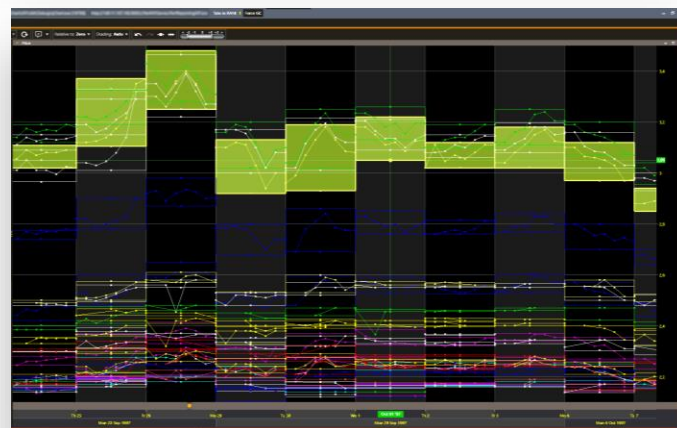
1st zoom level and the lines chart is shown



2nd zoom level – OHLC bars are shown



3rd zoom level - the daily snapshots.



Closer look at the daily snapshots.

Custom SciChart Features (Part 2)

Custom features were also added to SciChart, as requested by the client. These included:

- **Snapshot Chart type**

The client required a custom visualization which changed its appearance depending on the zoom level.

- The first zoom level shows data in form of line charts;
- The next zoom level it changes to the OHLC bars;
- The last one is a Daily Snapshots, where the boxes are initially the candles that corresponds to one day. The line charts inside are prices during that day;
- Daily Snapshot can be a filled candle (or a box) for one month or an empty candle.



418
LINE CHARTS

1200
DATAPPOINTS EACH
ON AVERAGE

38
SERIES IN EACH
PANE

300
DATAPPOINTS EACH



Ongoing performance investigation and improvements

As the whole application should be able to show the data of more than 150 markets of intraday data of over the 20 years, keeping an eye on performance is crucial.

With the data requirements, the application should keep the interactions like zooming, panning, and rollovers with tooltips smooth for the users.

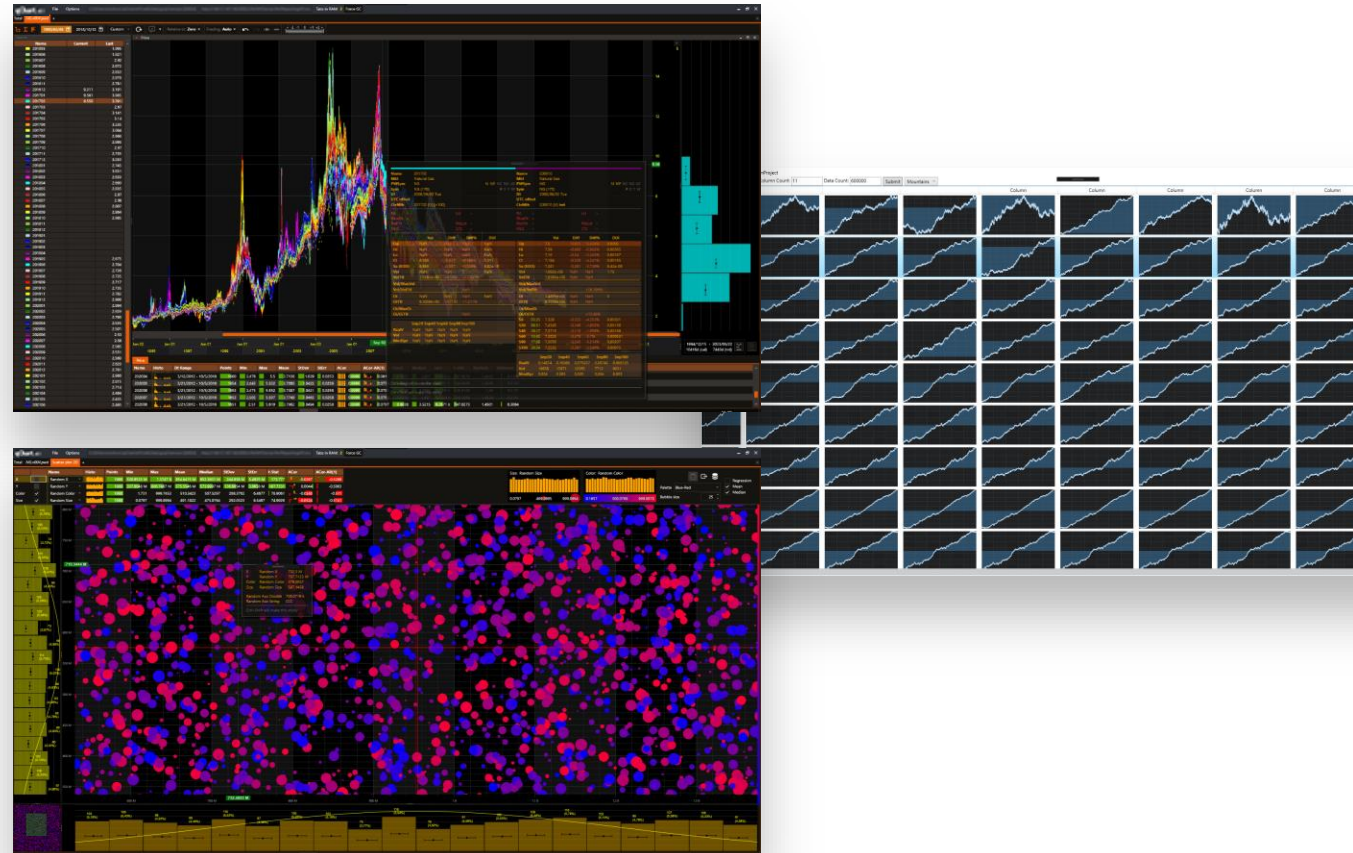
“The application needs to handle the trading information from over 150 markets across the globe, with over 20-years of intraday history.”

Prototypes and proof of concept

Further enhancements and prototypes were carried out by SciChart consultants to add extra features to the application. These included:

- **Custom Sticky Tooltip** – a tooltip that would integrate nested charts inside a rich custom tooltip. The tooltip should be able to stick in place creating a new window and allowing interaction with the inner charts.
- **Performance stressing – testing 200-300 2D & 3D charts on screen at once**
Performance stress tests were carried out in an application with 9 rows and 11 columns (as much as the current screen can display) of charts. Each cell has a Mountain chart with 600 000 datapoints.
- **Custom high-performance Scatter Renderable Series**
Further custom series were developed to allow you to show the density of the points with special bubble chart type. The application also has a birds eye view with an interactive chart inside.

This custom series is able to handle **5 mln to 10 mln** datapoints (more than 100 markets with 100,000 datapoints). The chart works with cursor and tooltips, zooming and panning functionalities.



Client Feedback

“In the past we experienced a lot of pain with third party chart controls which failed to deliver over time”

“SciChart looks to be a great product, and has proven to us that a general-purpose chart control can be used within a specific scenario to create high performance, big data analytics applications.”



About SciChart

SciChart is a cross-platform WPF, iOS, Android and Xamarin Scientific & Financial Charting Library.

SciChart supports rendering of complex, interactive, real-time charts with many millions of data points for demanding scientific, medical and financial applications and embedded systems that require high performance, rich interaction and smooth updates.

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