ETNA SOFTWARE

Whitepaper

Filtering companies by multiple criteria

Table of Contents:

1 Introduction 1

2 Problem Statement 2

3 ETNA Solution 3

4 Implementation 8

5 Summary 9

1 Introduction

This whitepaper discusses various ways of filtering companies for electronic trading purposes.

It covers methods of filtering companies by sector and industry, how to filter companies using information from balance sheets, cashflow and income statement documents.

Also, reporting and visualization of the filtering results will be covered.

2 Problem Statement

If you are broker and own a trading platform, you need to offer list of companies to be traded for your customers. It can be a spreadsheet downloaded from an exchange like NSDQ or NYSE or it can be a list from a clearing corporation or public market data feed, like Yahoo.Finance for example.

In the above cases, you as a broker will receive a list of companies (of course, on a daily basis since IPOs could happen every trading day) in a spreadsheet. Something like below:

	A	B	C
1	**Symbol**	**Name**	**Industry**
2	ACMR	A.C. Moore Arts & Crafts	Consumer Services
3	ADAM	A.D.A.M. Inc.	Computer Software
4	APPA	A.P. Pharma	Consumer Durables
5	AONE	A123 Systems	Energy
6	AAON	AAON	Capital Goods
7	ASTM	Aastrom Biosciences	Health Care
8	ABAX	ABAXIS	Capital Goods
9	ABBC	Abington Bancorp	Finance
10	ABMD	ABIOMED	Health Care
11	AXAS	Abraxas Petroleum Corporation	Oil & Gas Production
12	ACTG	Acacia Research Corporation	Multi-Sector Companies
13	ACAD	ACADIA Pharmaceuticals Inc.	Major Pharmaceuticals
14	ACCL	Accelrys	Technology
15	ANCX	Access National Corporation	Savings Institutions
16	ARAY	Accuray Incorporated	Medical/Dental Instruments
17	ACGY	Acergy S.A.	Oilfield Services/Equipment
18	ACET	Aceto Corporation	Specialty Chemicals
19	ACHN	Achillion Pharmaceuticals	Consumer Durables
20	ACIW	ACI Worldwide	Technology

A challenge here is to remove unwanted companies from a list of more than 6,500 traded symbols. For example, you do not want your customers to trade companies which deal with gambling or companies that have lots of debts.

Let's take a look how the subject application solves this problem in the next chapter.

3 ETNA Solution

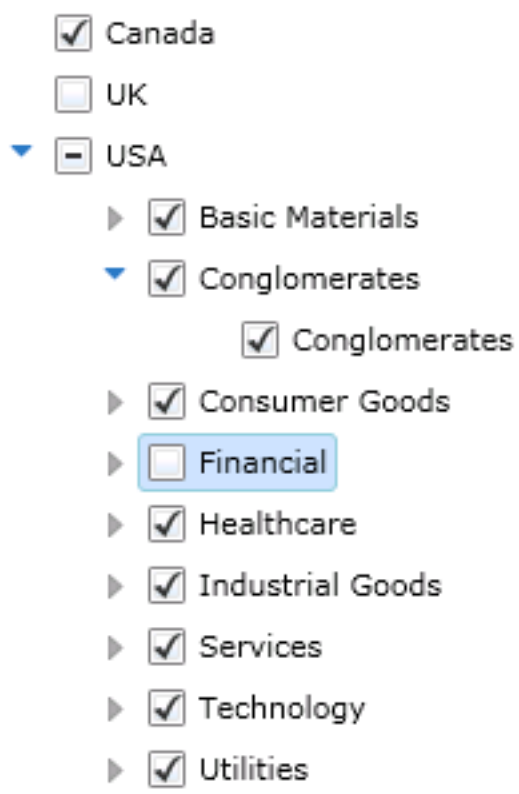
3.1 Overview

The application connects to the market data feeds and downloads data on a daily basis.
Market data feeds include financial documents; market fundamental information; sectors, industries and companies lists. Quotes and charts are loaded by request.
This info is downloaded in the database and is saved permanently.

Client (a Silverlight application) has access to this information and allows filtering companies by multiple criteria.

3.2 Sectors/Industries filters

Companies are grouped by country/sector/industry and are shown in a tree view. A user can select/deselect industry, sector or even the entire country to restrict trading for the underlying companies.
For example, following configuration removes all UK companies and all "Financial" companies from USA.



3.3 Market Map

Content of any node can be viewed at the market map area:

- Sectors by Country
- Industries by Sector
- Companies by Industries

What is interesting here?

- Rectangle's size is proportional to the market capitalization.
- Rectangle's colour depends on filtering results.
- Tooltip with filtering information pop-ups on mouseover.

You can see filtering results, market fundamental data and other useful information all in one place. Charting and quotes are accessible from the market map as well. Just double click the company's rectangle and a modal window will popup.

3.4 Charting and Quotes

A window with charting and quotes available from market map panel.

3.5 Financial filters

It's possible to create any custom filters based on financial information and simple mathematical expressions.

Values from the following documents are available:

- Balance Sheet
- Cash Flow
- Income Statement

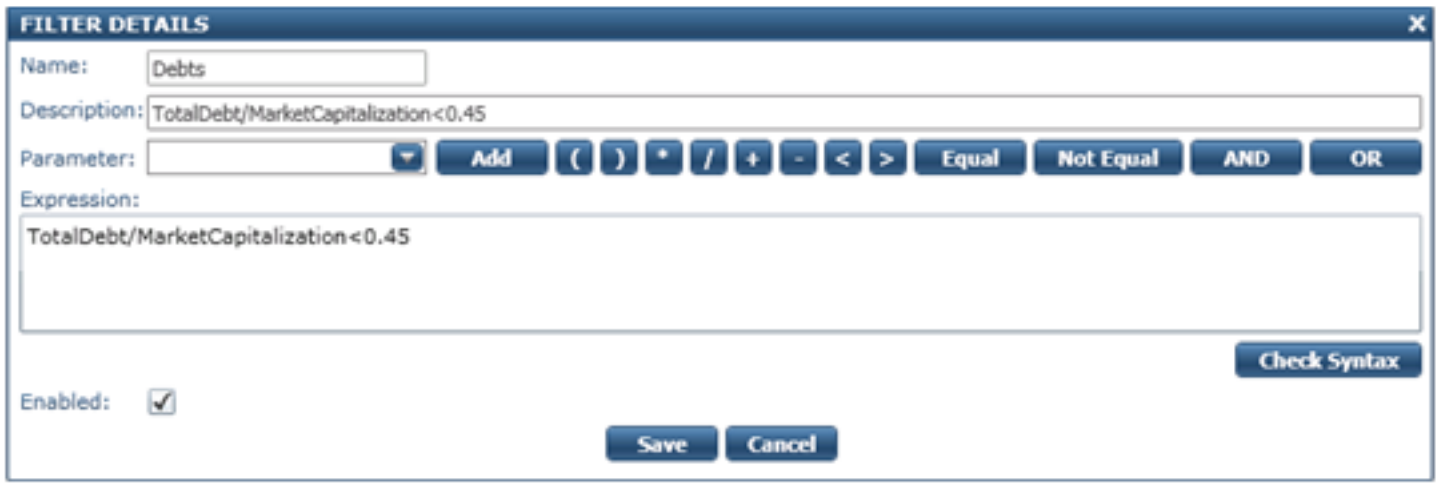
Market Fundamental Data can also be used:

- Market Capitalization
- EPS
- P/E

And more than 20 others fundamental values.

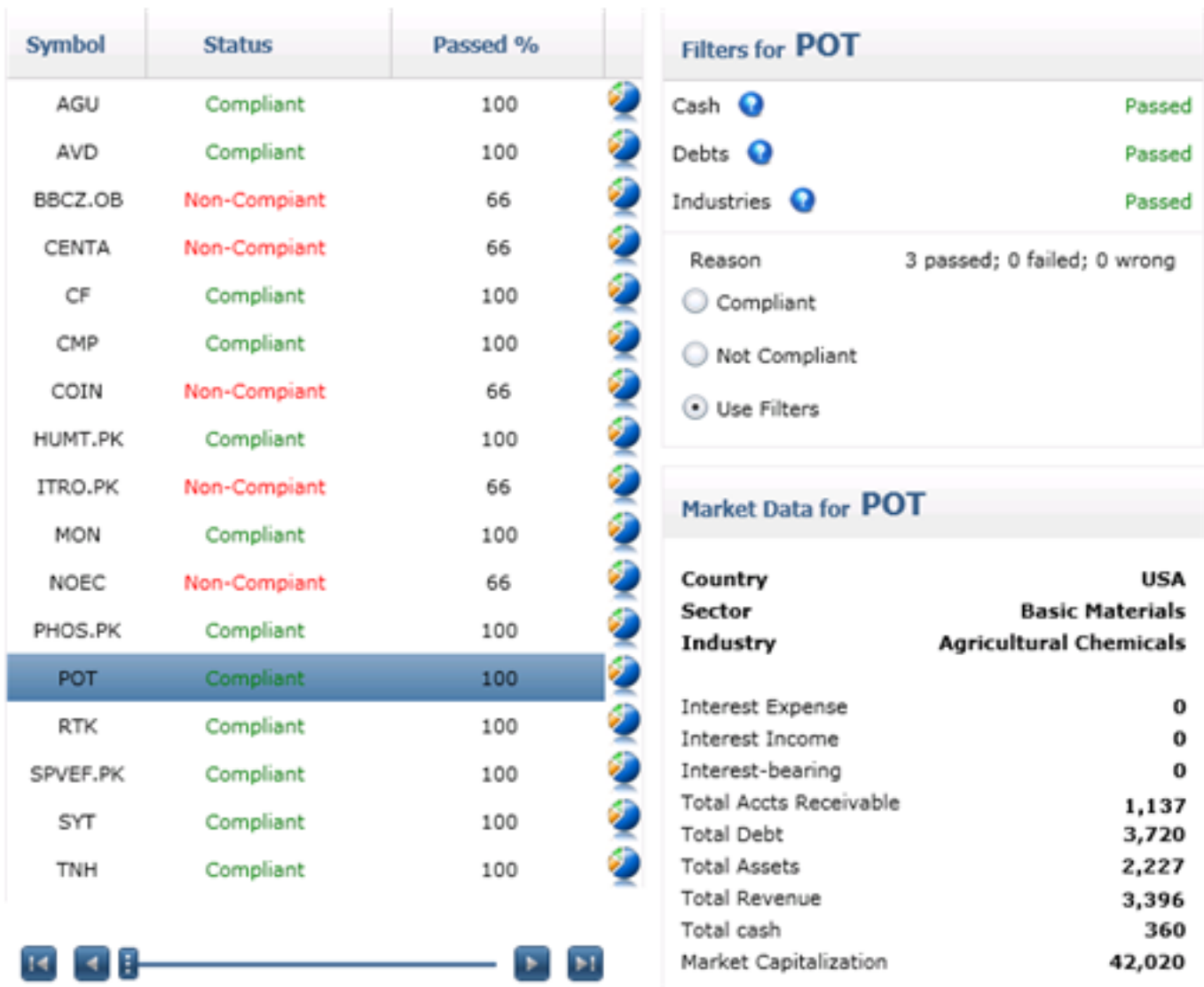
Just create a new filter, add financial variables, some math signs and evaluate the expression.
For example, companies which debts are more than 45% of its market capitalization will not pass this filter:

[Total Debts] / [Market Capitalization] < 0.45



3.6 View results

Search companies by various criteria and view list in the grid. Investigate what filters passed and what filters failed for the selected company.



Symbol	Status	Passed %
AGU	Compliant	100
AVD	Compliant	100
BBCZ.OB	Non-Compiant	66
CENTA	Non-Compiant	66
CF	Compliant	100
CMP	Compliant	100
COIN	Non-Compiant	66
HUMT.PK	Compliant	100
ITRO.PK	Non-Compiant	66
MON	Compliant	100
NOEC	Non-Compiant	66
PHOS.PK	Compliant	100
POT	Compliant	100
RTK	Compliant	100
SPVEF.PK	Compliant	100
SYT	Compliant	100
TNH	Compliant	100

Filters for POT

Cash	Passed
Debts	Passed
Industries	Passed
Reason	3 passed; 0 failed; 0 wrong

Compliant
Not Compliant
Use Filters

Market Data for POT

Country	**USA**
Sector	**Basic Materials**
Industry	**Agricultural Chemicals**
Interest Expense	0
Interest Income	0
Interest-bearing	0
Total Accts Receivable	1,137
Total Debt	3,720
Total Assets	2,227
Total Revenue	3,396
Total cash	360
Market Capitalization	42,020

3.7 Reporting

It's possible to download a list of companies with filter results and other information in the popular formats:

- PDF
- Excel
- CSV

4 Implementation

We used following technologies while developing the application:

- .NET Framework 4.0, C#
- Microsoft SQL Server 2008
- Silverlight 4.0

Web-application is installed on IIS 7.0 on a MS Windows 2008 machine. Also, Windows 2003 is supported.

Silverlight client was tested for compatibility with all popular browsers:

- Internet Explorer 7+
- Firefox 3+
- Safari 3+
- Chrome 2+
- Opera 9+

As an addition to the user interface functionality a well-document API is exposed to use in 3rd party software applications. It allows doing exactly the same as the client application from the code.
An example:

```
/// <summary>
/// Returns list of the industries by sector name.
/// Sector name is case insensitive.
/// </summary>
/// <param name="sectorName">Name of the sector (CI).</param>
/// <returns>List of the industries in the sector</returns>
public List<Industry> GetIndustries(string sectorName)
{
    ...
}
```

Help for API is available both in HTML and CHM formats.

5 Summary

The solution described above offers following ways to filter companies:

- By sector and industry
- By information from balance sheets, cashflow and income statement documents
- By market fundamental data

Application has rich user interface which allows to:

- View sector and industry in a tree view
- View market map
- View huge set of information for the every company
- Export companies lists to the popular formats

It connects to the following datafeeds and refreshes data on a scheduled basis:

- Market Fundamental
- Sector, industry and companies lists
- Financial documents
- Charting
- Quotes

It exposes API to 3rd party programs to:

- Get list of sectors, industries and companies
- Manage filters
- Apply filters to a list of companies
- Validate custom portfolio

Solution was developed using following technologies/applications:

- .NET Framework 4.0, C#
- Microsoft SQL Server 2008
- IIS 7.0
- Silverlight 4.0

ETNA Software is a leading e-trading software development company with 2 offshore R&D centers in Eastern Europe.

ETNA Software builds customized electronic trading software & financial market analysis tools for hedge funds, market makers, retail/agency brokers, market venues, financial technology firms and investment banks. We develop custom order management and execution components including risk management tools, market data adapters, web charting software, FIX connectivity solutions and more.

ETNA Software will help you to keep up with customer demands and innovate when budgets are tight.

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