



How to set up a simulation environment

2015-03-04

I often get asked for advice on setting up reasonably low cost simulation environments. It's a very valid question and I all too often hear of hobby traders who pay far too much for inferior setups. In this paper, I thought I'd give some tips on how to set up a strong futures simulation environment at very low cost. IT does require a little technical knowledge, but not very deep. If you're interested enough in this area to read this, then you're certainly able to learn any missing skills in that regard.

Assumption

I'm going to make the assumption that you're core need is a flexible simulation environment for end of day futures strategies.

Components

Ok, here's what we need:

- Proper data delivered daily.
- A database to store this data, along with useful metadata and such.
- A highly flexible simulation engine.
- Adapters to get the components above to speak to each other.

Data Source

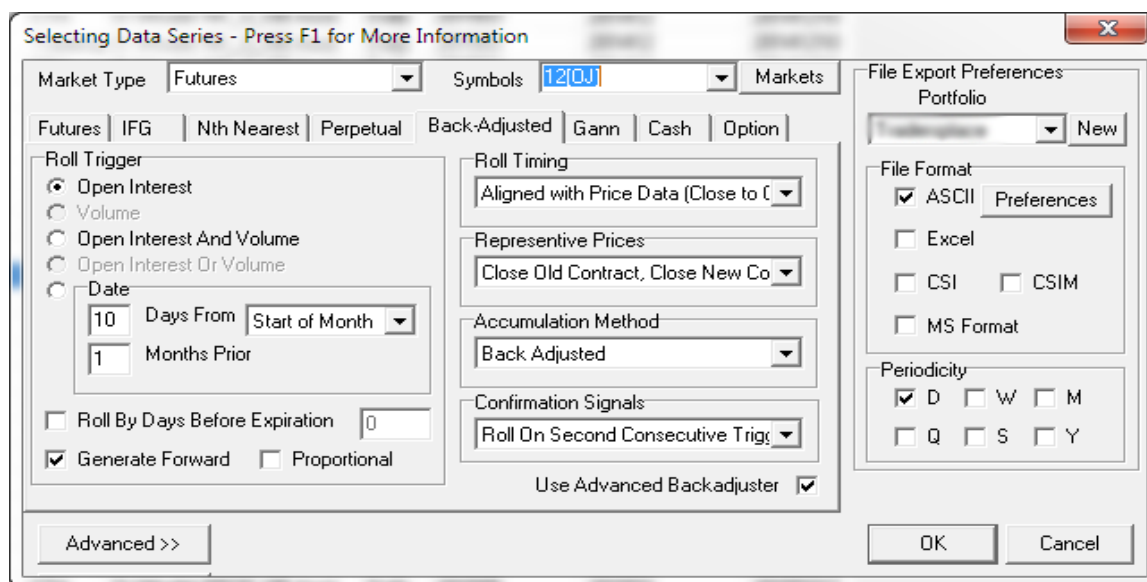
For end of day futures, the best value for money in my view is CSI Data. They have good data coverage and very flexible methodologies for creating futures continuations. Their World Futures package costs



about \$700/year which is about as low as you get for quality data. You'll also get a 15% discount using the coupon code *tradersplace*. https://www.csicheckout.com/cgi-bin/ua_order_form_nw.pl

If you're happy to make your own continuations, you could of course get the individual futures contracts for free from sites like Quandl.com and make your own engine for continuations. That's only for serious developers though, as there are many things that can go wrong with such an approach.

Below you see the settings dialog in CSI, where you can select how you want your futures continuation series to be calculated.



You can set up CSI to act as a service on the computer, downloading data files on a daily basis. The easiest is to just let CSI dump the files in CSV format and process it from there. You can select which fields to include in the CSV file and how they are laid out.

A screenshot of the "Edit Portfolio" dialog box. It has a title bar with "Edit Portfolio" and a close button. The "Name" field is required and contains "ACIES". The "Directory" field has a "Browse" button. Below are tabs for "Aggregate Files", "CSI Format Dir Settings", "Rounding", "CSI Format File Settings", "CSIM/MS Format Settings", "ASCII File Names", "Optional Fields", "General", "Historical Adjustments", "ASCII Field Layout", "ASCII Misc", "Ranging", "Displaying Data", and "Back Adjusting". A warning message states: "Warning, D can only be preceded by ASMEZP". The "Layout as:" field contains "DOHLCvINPZSMEU" and a checked "Form Columns" checkbox. A list of field codes is provided for selection.

Please choose from the following		
D for Date	O for Open	v for Contract Volume
N for Delivery Month Number	H for High	V for Total Volume
A for Delivery Month Letter	L for Low	i for Contract OI
S for Symbol	C for Close	I for Total OI
M for Market Name	\$ for Cash	U for Unadjusted Close
E for Exchange	B for Closing Bid	W for Unadjusted Volume
Z for Contract Size	K for Closing Ask	j for Unadjusted OI
P for Point Value	r for P/C Vol Ratio	p for TradeStation OI
t for Integer Strike	R for P/C OI Ratio	# for the CSI Mkt Number
T for Converted Strike		

The CSI user interface looks a bit like it's 1999 all over again, but the functionality and the data quality is solid.

Now, storing data in CSV files isn't the best solution of course. Flat files are fine for small amounts of data, but this can easily grow and you may want to keep better track of your data. That leads me to my next component.

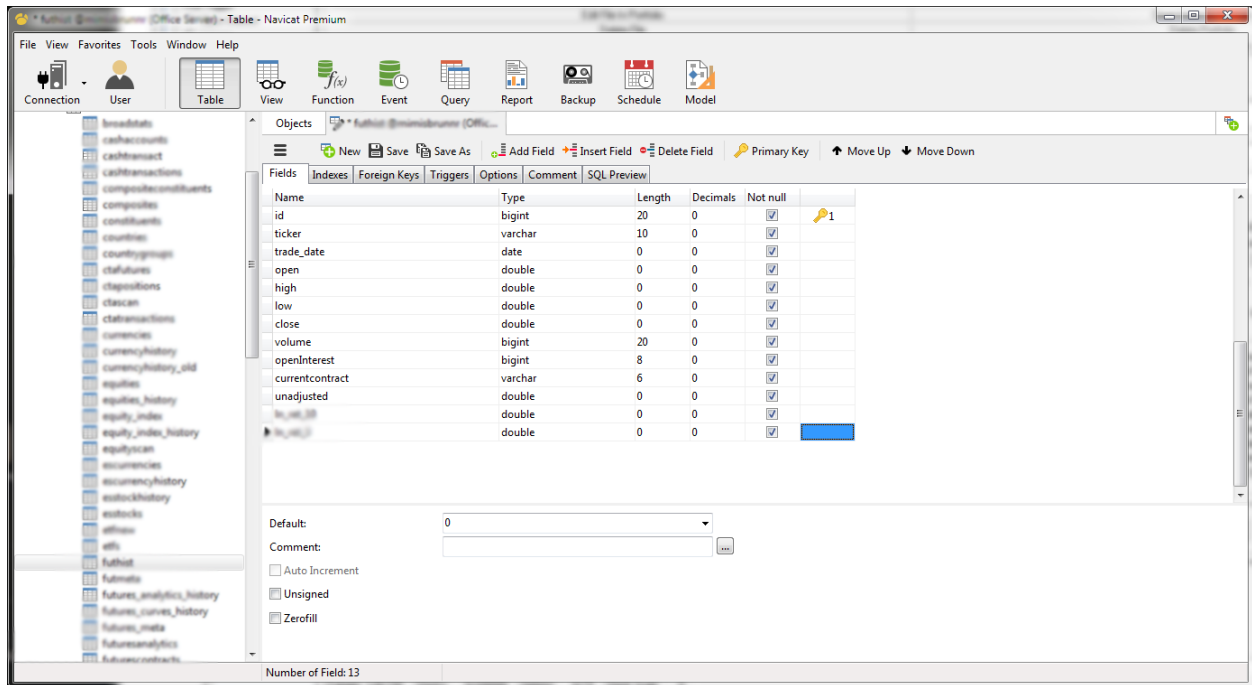


In house Database

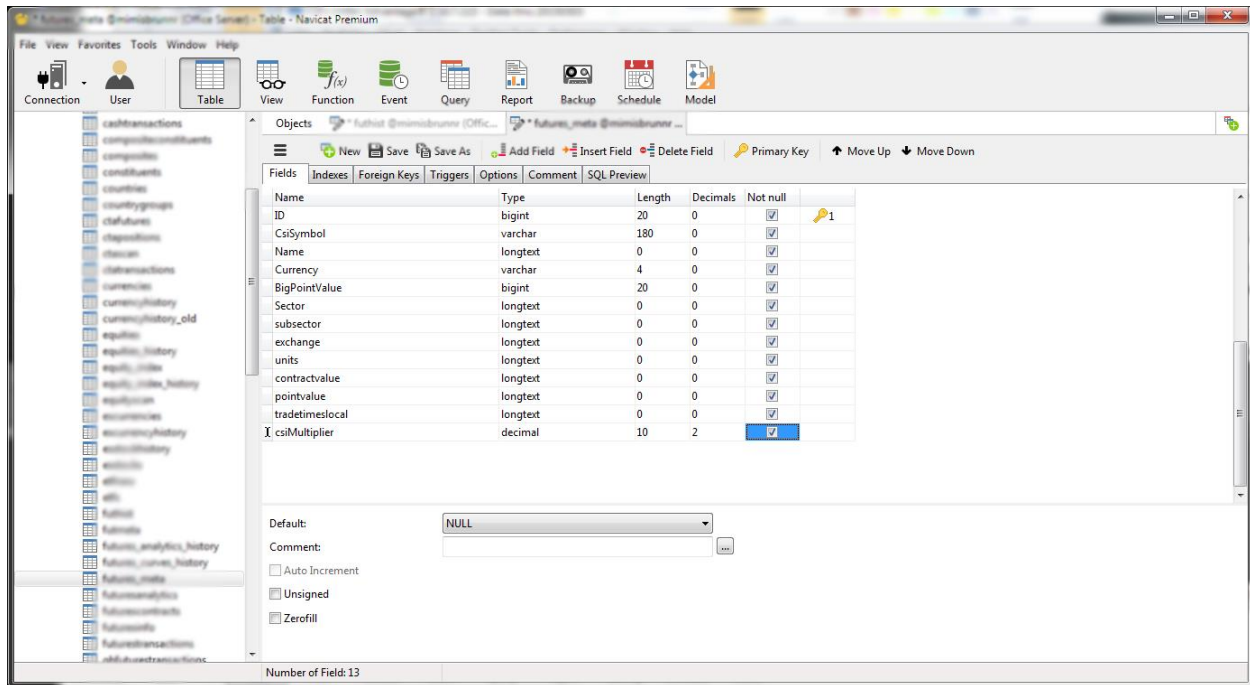
My recommendation is to use a real database server. Whether you run it as a background process on your main computer or have a dedicated server isn't that important early on. The flexibility of having a real database is valuable though, in my view. Best of all, it's free. My preferred database server is MySQL. It's free, easy to use and has everything you need.

One advantage with using your own db is that you're less dependent on your data provider. The database is in your own preferred format, and you can easily switch data provider down the road without switching everything else above. Later on, your simulation platform and other tools will be speaking to your database, not to whatever format your data provider wants to hand you.

What you need to do first is to figure out what kind of data you'll need. Most likely, that will involve at least a time series table and a metadata table. For the time series table, you'd likely want something similar to the fields below.



The next thing you'll probably need is a meta table. This just holds info about each futures contract that could be useful to access later on. Below you see a suggested table layout for that.



Most fields there are probably clear, but perhaps I should address that last one. What I called the csiMultiplier here (yeah, horrible name), is a way to standardize units. Even though many futures markets trade in minor currency units, such as USc, I find it useful to recalculate everything to major units before the data hits the simulation platform. Easier to deal with. So this is simply a multiplier that is normally 1, but for things like corn it's 0.01.

The meta table can either be populated manually or you could just extract the data from the CSI settings files.

Simulation Platform

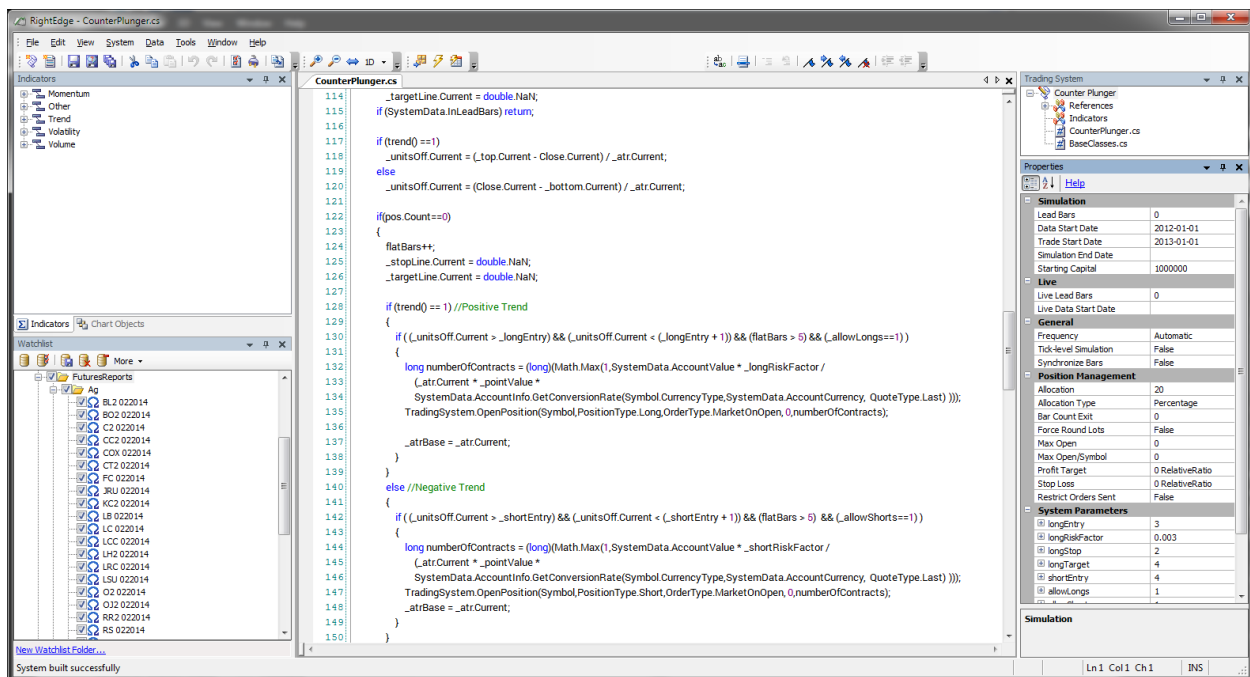
To most of you, it should come as no surprise that I prefer RightEdge. In my view, this \$500 once-off platform is stronger than most of these \$5,000 and above solutions I've seen. It does assume that you're familiar with C# and comfortable with compilers though.

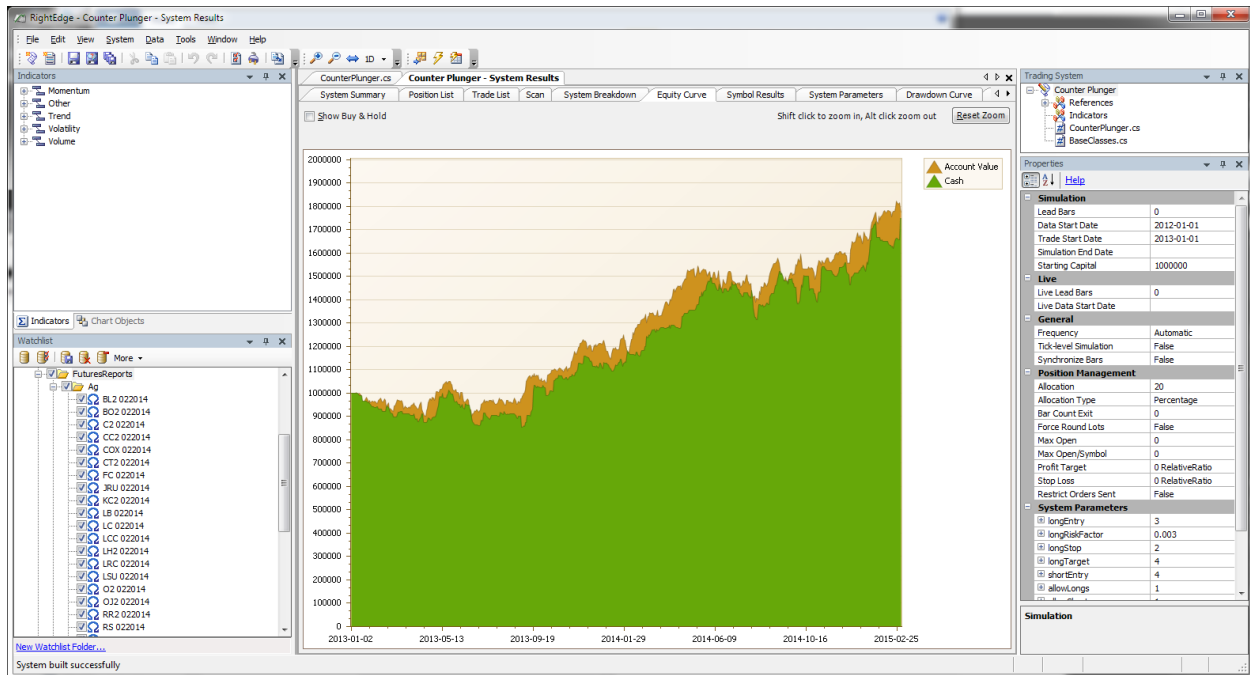


I'm using RightEdge for live trading solutions for multiple accounts in the double digit millions. Some of them very complex, using logic that is simply not possible in most other platforms. The great thing with RE is that it's extremely extendable, and you can always make your own C# plugins to add whatever functionality you're missing.

You'll also get a \$50 discount if you use coupon code *Clenow*. Hey, I'm recommending it anyhow, why not get a discount for my readers and a kickback for myself while I'm at it?

RightEdge can be a little intimidating to get started with if you're not used to compilers and C#. If you're new at this, I'd suggest starting by downloading the trading models I've put in the research library on the site. That source code should help you understand the logic of how to construct strategies in this environment.





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With the three components above, you've got a pretty strong setup. What's left is of course how you integrate all of this.

Data Adapters

The first thing you'll need is a way to get the CSI Data files into your MySQL. That's quite easy if you're familiar with any standard programming language. My own preference is, as you know, C#, but any modern language is fine.

Make a little exe-file that runs on a daily schedule. It should go through all files in your CSI data folder and read the time series for each file. Keep in mind that with back adjusted data, all previous history changes when there's a roll. Therefore, the easiest solution is to simply flush your MySQL data and replace with the new time series file on a daily basis.

Second, you'll need an adapter to get RightEdge to retrieve data from your MySQL table. There's a well-documented API for that and you'll find examples pre-installed with RightEdge. They're located under your roaming profile, under `yye data/rightedge/1010.1.0.0/samples/rightedgeplugins`. A great place to hide valuable info...

If there's interest, I'll make a sample with comments and publish here later. Email me if you'd like to vote for seeing such code soon...

Compile your data retrieval plugin, put it in the RE plugins folder and you're good to go.

Now we're almost ready. You'll also need to make a watchlist for RightEdge. This can be done manually or automatically. Manually, you'll just set up your new data service, then make a new watch list, and set up each instrument. If you're setting up a limited number of instruments, it's easy to do this manually. If you're doing it in larger scale, you may want to look at automatically writing to the `SymbolConfig.xml` file located under the same roaming profile.



When you're setting up the instruments, there are a couple of things to keep in mind. Most importantly, tick size and margin can mess things up. The tick size sets the minimum move allowed by the instrument. This is fine for normal instruments, but for back adjusted futures this goes right out the window. Leave it at zero or you'll get weird results.

Margin changes all the time and setting a fixed number doesn't make sense for historical sims. Even less so in the context of back adjusted series.

The expiration data is irrelevant. Set to whatever. Contract size is very important. Get that one right. The decimal places is important, in that you don't set it too low. Again, the problem is with back adjusted series. You need higher decimal resolution. Set it to at least a few numbers higher than the actual market.



Symbol Information - LC

Asset Information Company Information Service Data

Asset Type: Future Construct Bars From: Trades

Asset Currency: U.S. Dollar (USD) Exchange (blank for default): CME

☐ Ignore Bar Data Errors

Contract Specifiers

Tick Size: 0 Contract Size: 40000

Initial Margin: 0.01 Expiration Date: 2014-02-11

Options

Strike Price: 0.00 Contract Type:

Decimal Places: 6 Short Margin %: 0 %

OK Cancel Help

The 'company info' tab is not used for anything by default. It's a very useful thing if you make your own plugins though. I make plugins to analyze attribution and allocation on sector basis, and that's when this comes into play. If you don't need that, keep it blank.