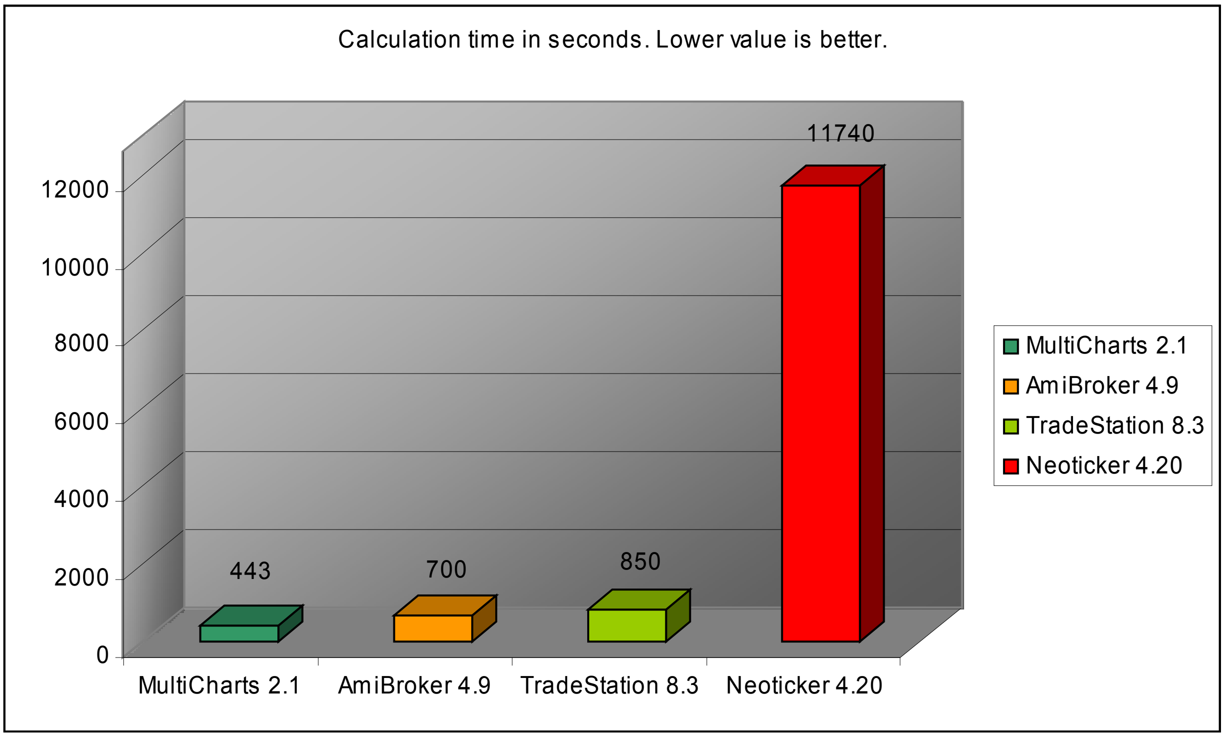
Exhaustive Optimization Benchmark Analysis

Trading Platform	Calculation time, seconds
MultiCharts 2.1	**443**
AmiBroker 4.9	**700**
TradeStation 8.3	**850**
Neoticker 4.20	**11740**



Software:
AmiBroker 4.90
NeoTicker 4.20 Demo Build 14, Grid Optimizer 1.00 Demo Build 19
MultiCharts 2.1 Build 976.1109 Beta 3
TradeStation 8.3 Build 1301

Hardware:
AMD Athlon(tm) 64 X2 Dual
Core Processor 3600+
2.01 GHz, 896 Mb RAM

Chart settings:
Symbol: Australian Dollar. Data Range: 173000 bars on the chart. Data mode: Offline.

Optimized parameters:

MACD Fast	From 9 To 15 Step 1
MACD Slow	From 20 To 28 Step 1
Signal average	From 5 To 10 Step 1

# of simulations 378

Strategy Script:

MultiCharts:

```
inputs:  Fast( 12 ), Slow( 26 ), MACD( 9 );
variables:  MyMACD( 0 ), MACDAvg( 0 ), MACDDiff( 0 ) ;

MyMACD = Average(c,Fast) - Average(c,Slow);
MACDAvg = XAverage( MyMACD, MACD) ;
MACDDiff = MyMACD - MACDAvg ;

if CurrentBar > 2 then begin

      if MACDDiff crosses over 0 then
              Buy ( "MacdLong" ) next bar at market ;

      if MACDDiff crosses under 0 then
              Sell Short ( "MacdShort" ) next bar at market ;

end;
```

TradeStation:

```
inputs:  FastLength( 12 ), SlowLength( 26 ), MACDLength( 9 );
variables:  MyMACD( 0 ), MACDAvg( 0 ), MACDDiff( 0 ) ;

MyMACD = Average(c,FastLength) - Average(c,SlowLength);
MACDAvg = XAverage( MyMACD, MACDLength ) ;
MACDDiff = MyMACD - MACDAvg ;

if CurrentBar > 2 then begin

    if MACDDiff crosses over 0 then
           Buy ( "MacdLE" ) next bar at market ;

    if MACDDiff crosses under 0 then
           Sell Short ( "MacdSE" ) next bar at market ;

end;
```

AmiBroker:

```
mfast = Optimize( "MACD Fast", 12, 9, 15, 1 );
mslow = Optimize("MACD Slow", 26, 20, 28, 1 );
sigavg = Optimize( "Signal average", 9, 5, 10, 1 );

Buy = Cross( MACD( mfast, mslow ) , Signal( mfast, mslow, sigavg ) );
Sell = Cross( Signal( mfast, mslow, sigavg ), MACD( mfast, mslow ) );

Cover = Cross( MACD( mfast, mslow ) , Signal( mfast, mslow, sigavg ) );
Short = Cross( Signal( mfast, mslow, sigavg ), MACD( mfast, mslow ) );
```

Neoticker:

```
function MACD_backtest : double;
var my_macd, signal_line : variant;
var diff_0, diff_1 : real;
begin
     my_macd := Itself.MakeIndicator('macd1', 'MACD', ['1'], [param4.str, param1.str,
param4.str, param2.str]);
     signal_line := Itself.Makeindicator('avg1', 'xaverage', ['macd1'], [param3.str]);
     if not(my_macd.valid[1] and signal_line.valid[0]) then
     begin
          itself.successall := false;
          exit;
     end;

     diff_0 :=  my_macd[0] - signal_line[0];
     diff_1 :=  my_macd[1] - signal_line[1];
```

```
    if (diff_1 <= 0) and (diff_0 > 0) then
        trade.BuyAtMarket(100, 'Long Entry');

    if (diff_1 >= 0) and (diff_0 < 0) then
        trade.SellAtMarket (100, 'Short Entry');

    ItSelf.Answer[1] := my_macd[0];
    ItSelf.Answer[2] := signal_line[0];

end;
```

Disclaimer:

Please note that, while every effort has been made to ensure that information contained herein is accurate and up to date, TS Support, LLC accepts no responsibility for errors or omissions that may occur.

No person should place reliance on information contained herein where such reliance may result in loss, damage, or injury.

Product names and trademarks featured or referred to in this benchmark analysis are the property of their respective trademark holders.