

Performance Validator

Tutorial by Sasha Tarasova

Running - Performance Validator x64 (Evaluation Version) -

File Launch Edit Settings Managers Tools Data Views Help

Callstack Statistics Relations Call Tree Call Graph Analysis Line Times Diagnostic Tutorials

Refresh Filters... Columns... Display...

Class::Method	Call Count	Call Cou...	Function	Function...	Children	Child
get_direction_array	918,630	2.42%	88,022.02	31.17%	0.00	
distribution2::get_i_xmin	1,289,981	3.40%	25,886.22	9.17%	0.00	
distribution2::get_i_xmax	1,290,569	3.40%	25,827.70	9.14%	0.00	
DBVALU	224,960	0.59%	14,603.33	5.17%	3,516.22	
distribution2::inter2_Old	442,964	1.17%	11,313.35	4.01%	64,621.75	
distribution2::inter2_New	442,965	1.17%	8,613.30	3.05%	66,188.76	
DINTRV	269,952	0.71%	5,316.38	1.88%	0.00	
distribution::find_sigma_distrib...	15,961	0.04%	3,912.59	1.39%	1,535.13	
distribution::clear_flags	825,815	2.18%	3,192.12	1.13%	0.00	
distribution::NN	2,599,919	6.85%	2,663.75	0.94%	0.00	
distribution2::get_direction	918,058	2.42%	2,393.66	0.85%	88,908.90	
s_me_table::GetMeTable	367,479	0.97%	2,326.88	0.82%	774.45	
find_line	657,899	1.73%	2,272.64	0.80%	0.00	
distribution2::inter2_p2_local	377,466	0.99%	2,235.97	0.79%	722.93	
distribution2::inter2	442,965	1.17%	2,166.83	0.77%	150,737.16	
distribution::XI	2,173,150	5.73%	2,157.70	0.76%	0.00	
distribution2::XI	2,039,344	5.37%	2,121.51	0.75%	0.00	
distribution2::inter2PlusExtrapo...	382,160	1.01%	2,082.36	0.74%	149,103.30	
distribution2::get_xmax	1,289,736	3.40%	2,004.55	0.71%	25,810.95	
distribution2::alignB	11,434	0.03%	1,985.65	0.70%	154,611.20	
distribution2::get_xmin	1,289,950	3.40%	1,916.39	0.68%	25,885.62	
range	16,715	0.04%	1,909.43	0.68%	34,156.94	
ValueErr::ValueErr	1,840,842	4.85%	1,779.45	0.63%	0.00	
Compound::GetFla	582,507	1.54%	1,626.09	0.58%	648.91	

Filename: C:\LISEcute\...\Distribution\L_Distr2.cpp Line 165
 Function: get_direction_array
 Module: c:\LISEcute\instal_MSVC\LISE++_MSVC.exe
 Address: 0x00007f7d13e47a0

Call Count: 852,608

Total time (Av. 0.10) 81,275.55
 Runtime 264,724.70

Shortest / Longest 0.07 / 1.25


Function time (Av. 0.10) 81,275.55
 Child time (0 children) 0.00

Display Line Times

```

150      0      0.00      if( (FileDebugDistr=mfopen(NameFileDebugDistr , "wt+"))=
151      0      0.00      OpenFlagPrintToFile=1;
152      0      0.00      }
153
154      0      0.00      if( OpenFlagPrintToFile)
155
156      0      0.00      {
157      0      0.00      fprintf(FileDebugDistr, "%s\t%f\t%f\t%f\t%f\t%s\t%s", na
158      0      0.00      for(int i=0; i <= N; i++) fprintf(FileDebugDistr, "\t%f"
159
160      //}endif
161
162      //www
163      //www
164
165 852,608 81,275.55 int get_direction_array(double *axis, int points) // -1 - n
166 867,713 296.47 double sum_abs=0;
167 867,714 295.42 double sum_sim=0;
168
169 double *p1, *p0;
170
171 867,714 300.12 p1= &axis[1];
172 867,715 296.19 p0= &axis[0];
173
174 867,715 296.19 for(int i=0; i<points-1; i++)
175
176 17627,766,880 9,408.84 { double dif = *p1 - *p0;
177 17727,766,880 9,414.37 sum_abs += dif>0 ? dif : -dif;
178 17827,766,880 9,377.09 sum_sim += dif;
179 17927,766,880 9,361.50 p0 = p1; p1++;
180 18027,766,880 9,393.98 }
181
            
```

Ready | 0 | 16,919 | 22,254 | 1,627 CollectOn | Running | LISE++ MSVC.exe


FRIB Facility for Rare Isotope Beams
 U.S. Department of Energy Office of Science
 Michigan State University

ST @ MSU, Slide 1

Installing

The program is available from Software Verify and can be tested using a free trial, or by obtaining licenses.

<https://www.softwareverify.com/product/performance-validator/>

Software *verify*
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C# and C++ profiler – Performance Validator 7.79

Struggling to find the performance bottlenecks for your software written in multiple languages?

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Documentation

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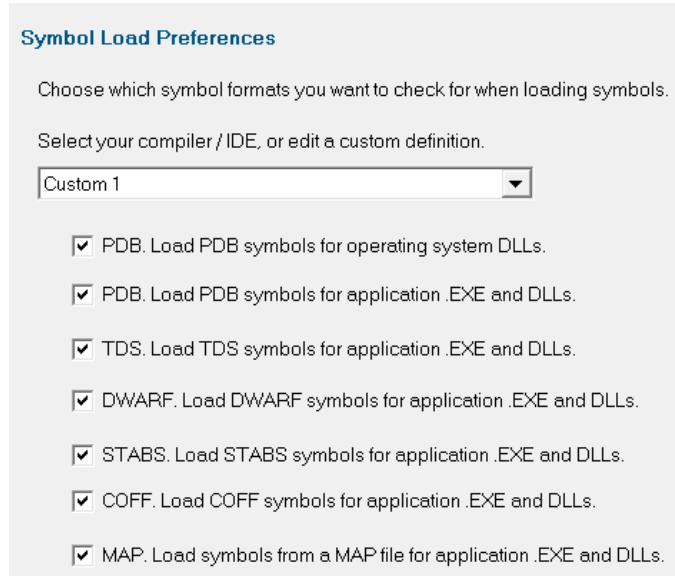
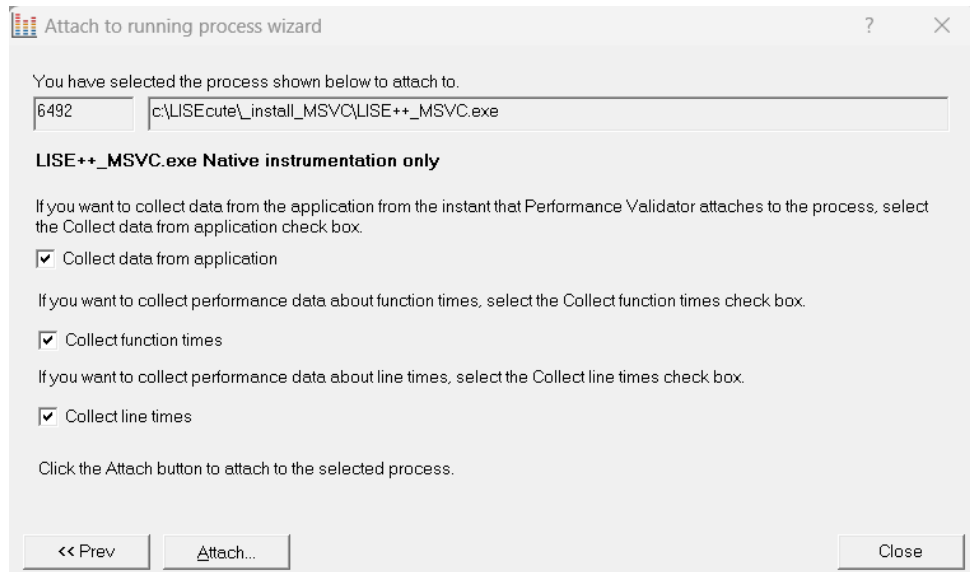
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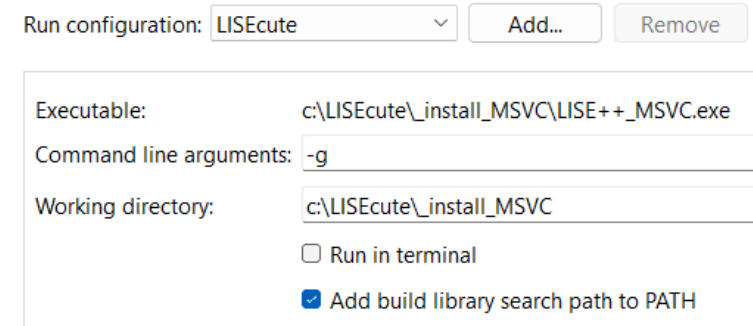
<https://www.softwareverify.com/support/>

Set Up

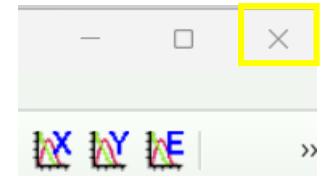
Inject into program running in Profile mode



Run



Once you are done running the program, **close it** so the profiler program can save and present the data.



Statistics + Source Code View

Num ...	Av Func	Av Fu...	Av Total	Av Tot...	Call C...	Call Cou...
---------	---------	----------	----------	-----------	-----------	-------------

Attribute	Description
Num Children	# of child functions
Av Function	Average time a function takes to execute
Av Total	Average total time a function + child functions takes to execute
Call Count	# of times a function is called
Function	Time it takes a function to execute
Children	Time a function's child functions take to execute
Total	Time a function + child functions take to execute
Longest	Longest time a function + child functions take to execute
Shortest	Shortest time a function + child functions take to execute

Filename: C:\LISEcute\L_Distribution\L_Distr2.cpp Line 165
Function: get_direction_array
Module: c:\LISEcute\install_MSVC\LISE+_MSVC.exe
Address: 0x00007f7d13e47a0

Call Count: 1,775,419

Total time
 (Av. 0.10) 181,881.03
 (Av. 0.00%) 30.91%

Shortest / Longest
 0.07 / 1.25
 0.00% 0.00%

Function time
 (Av. 0.10) 181,881.03
 (Av. 0.00%) 30.91% 0.00%

Runtime: 588,474.29
Child time: (0 children) 0.00

Display Line Times

```

150      0      0.00      if( (FileDebugDistr=fopen(NameFileDebugDistr , "wt+"))=
151      0      0.00      OpenFlagPrintToFile=1;
152      0      0.00      }
153
154      0      0.00      if( OpenFlagPrintToFile)
155      {
156      0      0.00      fprintf(FileDebugDistr, "%s\t%f\t%f\t%f\t%f\t%s\t%s", na
157      0      0.00      for(int i=0; i <= N; i++)fprintf(FileDebugDistr, "\t%f"
158      0      0.00      fprintf(FileDebugDistr, "\n");
159
160      }
161      //endif
162
163      //%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
164
165  2,990,416  324,122.63  int get_direction_array(double *axis, int points) // -1 - n
166  3,013,062      1,176.08  double sum_abs=0;
167  3,013,062      1,170.66  double sum_sim=0;
168
169      double *p1, *p0;
170
171  3,013,063      1,192.68  p1= &axis[1];
172  3,013,063      1,175.19  p0= &axis[0];
173
174  3,013,063      1,174.81  for(int i=0; i<points-1; i++)
175      {
176  696,418,016      37,351.81      double dif = *p1 - *p0;
177  796,418,021      37,379.44      sum_abs += dif>0 ? dif : -dif;
178  896,418,036      37,229.01      sum_sim += dif;
179  996,418,048      37,169.87      p0 = p1; p1++;
180  096,418,048      37,242.41      }
181
        
```

The top bar shows **total function times** (including children):

- Average total function time relative to runtime
- Total function time relative to runtime

The second bar shows the **range of times for individual function calls**, including children:

- Shortest function time relative to runtime
- Longest function time relative to runtime

The last bar shows the segmentation of **time in function and in child functions**:

- Average time in function relative to runtime
- Total time in function relative to runtime
- Total time in child functions relative to runtime

Visit count | Time

Relations

Most called and most time consuming functions

Class::Method	Children	Children %	Total	Total %	Module
MainWindow::CmTransAll	1,457,911.43	99.48%	1,457,911.43	99.48%	lise++_msvc.exe
nucleusReglage	1,444,834.10	98.58%	1,444,834.10	98.58%	lise++_msvc.exe
c_rendmom	1,358,509.46	92.69%	1,358,509.46	92.69%	lise++_msvc.exe
transmission	1,352,900.15	92.31%	1,352,901.08	92.31%	lise++_msvc.exe
tab_range	110,295.58	7.53%	110,311.95	7.53%	lise++_msvc.exe
trans_ChargeState	1,365,994.69	93.20%	1,365,994.69	93.20%	lise++_msvc.exe

Promote

Promote All

Functions called by function: MainWindow::CmTransAll

Class::Method	Call Count	Call Cou...	Function	Function...	Children	Ch
Celement::equal	925,503	0.55%	5,855.29	0.40%	4,760.71	
Celement::Z	3,546,507	2.10%	4,423.20	0.30%	0.00	
Celement::Celement	819,116	0.49%	1,463.80	0.10%	9,341.59	
Celement::N	961,875	0.57%	1,212.48	0.08%	0.00	

Promote

Promote All

Callers of function: MainWindow::CmTransAll

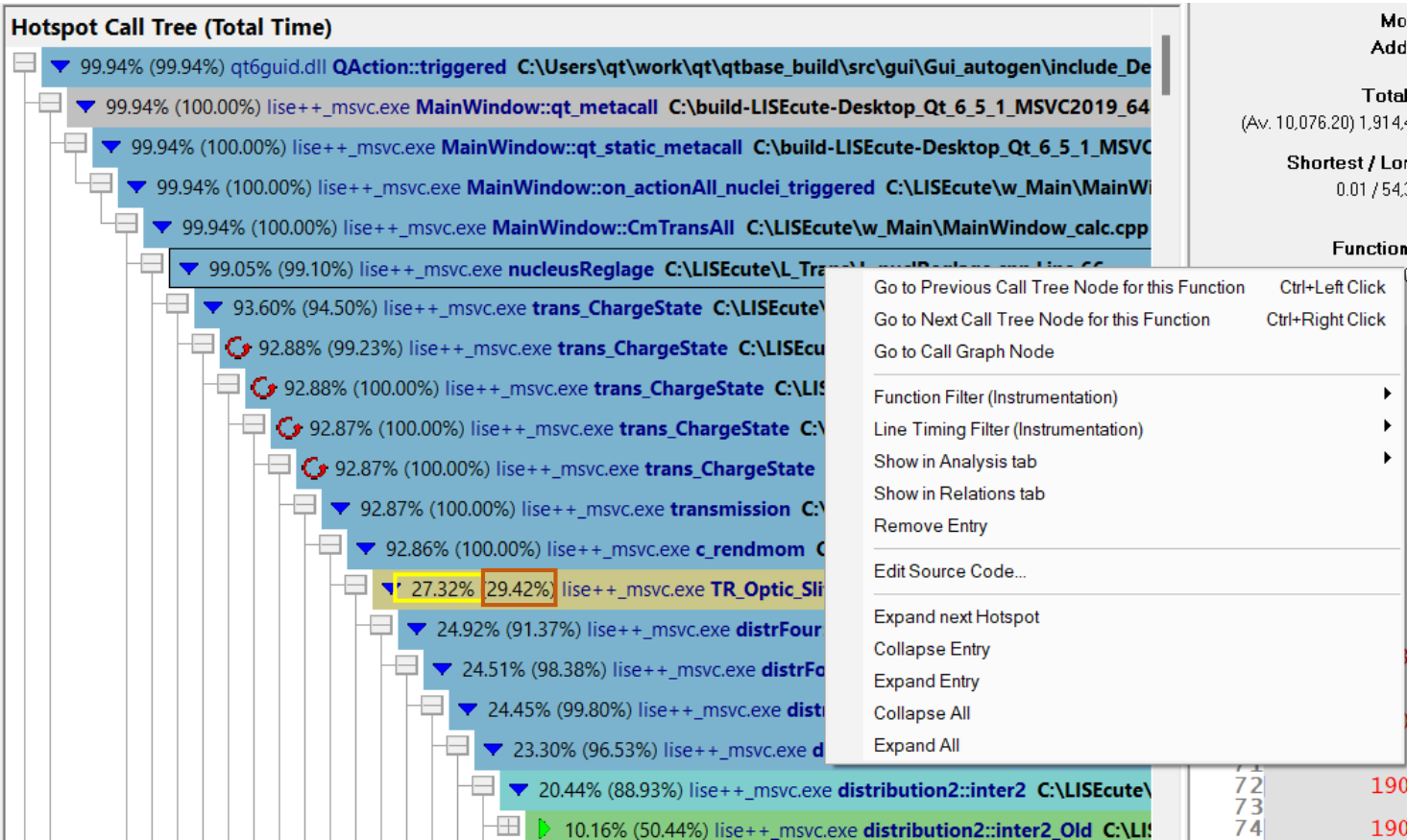
Class::Method	Call Count	Call Cou...	Function	Function...	Children	Child
MainWindow::on_actionAll_nuc...	1	0.00%	0.00	0.00%	0.00	

Display:

Av. Total Time	▼
Call Count	
Function Time	
Total Time	
Av. Total Time	
Av. Func Time	

109			
110	3,546,507	4,423.20	int Z() const {return z;};
111	961,875	1,212.48	int N() const {return n;};
112	2,877,644	3,599.48	int A() const {return a;};
113	142	0.25	int Q() const {return q;};
114			
115	57,994	71.38	void ChangeVerify(bool v){Verify=v;};
116	57,994	70.30	bool GetVerify() const {return Verify;};
117			
118	1,039,689	1,296.14	double Zd() const {return double(z);};
119	4,916	5.92	double Nd() const {return double(n);};
120	2,209,067	2,709.61	double Ad() const {return double(a);};
121	71,934	97.18	double Qd() const {return double(q);};
122			
123	517	0.68	void SetQ(int q_init) {q=q_init;};
124			bool IsPrimaryBeam();
125	1,310,619	1,613.96	bool IsGamma() {return (z==0 && n==0);};
126			

Call Tree



Call tree colours

The tree is coloured using the customisable [Hotspot Colours settings](#) that range from 100% down to 0%.

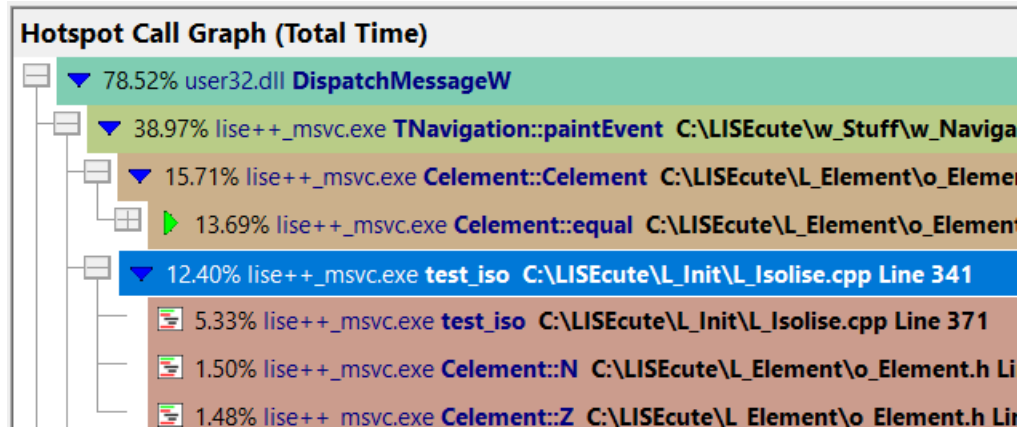


TR_Optic_Slit -> Contributed **29.42%** of its parent's function time
 Contributed **27.32%** to total run time

Call Graph

Sort:

- Total Time
- Call Count
- Total Time
- Average Time



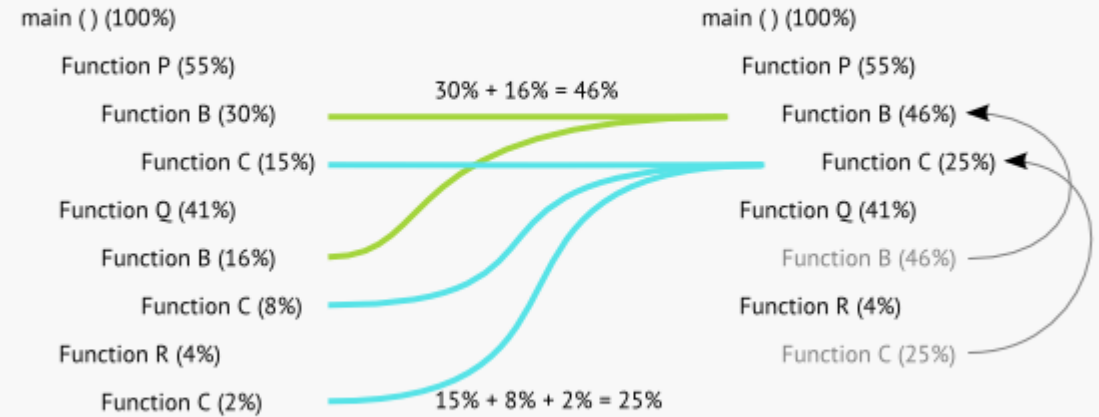
Multiple locations

vs.

Once

A Call Tree

A Call Graph



Percentages in tree and graph both show contribution to total run time

Analysis + Line Times

Query Type: Most Time Consuming Hotspots

Function:

Comparison:

Range:

Search

Hotspots

- Class
- Function
- File name
- Module name
- Address
- Number of children
- Average Total Time
- Average Total Time %
- Total Time
- Total Time %
- Function Time
- Function Time %
- Child Functions Time
- Child Functions Time %
- Longest Time
- Longest Time %
- Shortest Time
- Shortest Time %
- Visit Count
- Visit Count %
- Most Visited Hotspots
- Most Time Consuming Hotspots**
- Number of descendants
- Number of ascendants
- Distance to root
- Distance to leaf
- Recurring function
- Recurring function depth

24.50% (90.69%) lise++_msvc.exe distrFour::ChangeBase C:\LISEc...

24.10% (98.36%) lise++_msvc.exe distrFour::MakeUniform C:\LISEc...

24.04% (99.80%) lise++_msvc.exe distribution2::alignB C:\LISEc...

22.91% (96.54%) lise++_msvc.exe distribution2::inter2PlusEx...

20.10% (88.94%) lise++_msvc.exe distribution2::inter2 C:\...

1.25% (5.53%) lise++_msvc.exe distribution2::get_xmax C...

1.25% (5.52%) lise++_msvc.exe distribution2::get_xmin C...

0.00% (0.01%) lise++_msvc.exe distribution2::get_i_xmax

File	Visit Count	Total
C:\LISEcute\L_Distribution\o_Distr2.h	66	0.68
C:\LISEcute\L_Dbf\d_getrec.cpp	11,820	20.77
C:\LISEcute\L_Dbf\d_getfld.cpp	12,760	7.62
C:\LISEcute\L_Dbf\d_delrec.cpp	0	0.00
C:\LISEcute\L_Dbf\d_cpysttr.cpp	0	0.00
C:\LISEcute\L_Dbf\d_addrcc.cpp	0	0.00
C:\LISEcute\L_Calise\L_Charges_optimum.cpp	340	0.31
C:\LISEcute\L_Calise\L_Charges_global.cpp	703	3,006.81