Performance Analyse mit dem AMD CodeAnalyst

Inhalt

1. Einschränkungen R-Profiling

http://adv-r.had.co.nz/Profiling.html

Profiling does not extend to C code. You can see if your R code calls C/C++ code but not what functions are called inside of your C/C++ code. Unfortunately, tools for profiling compiled code are beyond the scope of this book (i.e., I have no idea how to do it).

2. AMD CodeAnalyst

Das im Folgenden beschriebene Vorgehen zur Performance-Analyse mit dem CodeAnalyst basiert auf der Anleitung unter http://evolvedmicrobe.com/blogs/?p=359

2.1. Ändern der compilation settings

C:\Users\YOURNAME\.R\Makevars, add:
CXXFLAGS+=-gdwarf-2
DLLFLAGS=

You can verify this worked correctly by checking that `-gdwarf-2` appears in the compilation messages, and that `-s` is missing in the final linker step.

Die Datei Makevars.win im src-Ordner des R-subcon-Package wurde erweitert:

```
PKG_LIBS = $(shell "${R_HOME}/bin${R_ARCH_BIN}/Rscript.exe" -e "RcppShark:::LdFlags()") $(LAPACK_LIBS) $(BLAS_LIBS) $(FLIBS)
CXXFLAGS+=-gdwarf-2
DLLFLAGS=
```

2.2. AMD CodeAnalyst installieren

Download des Tools für Windows unter:
http://developer.amd.com/tools-and-sdks/archive/compute/amd-codeanalyst-performance-analyzer/codeanalyst-performance-analyzer-for-windows/

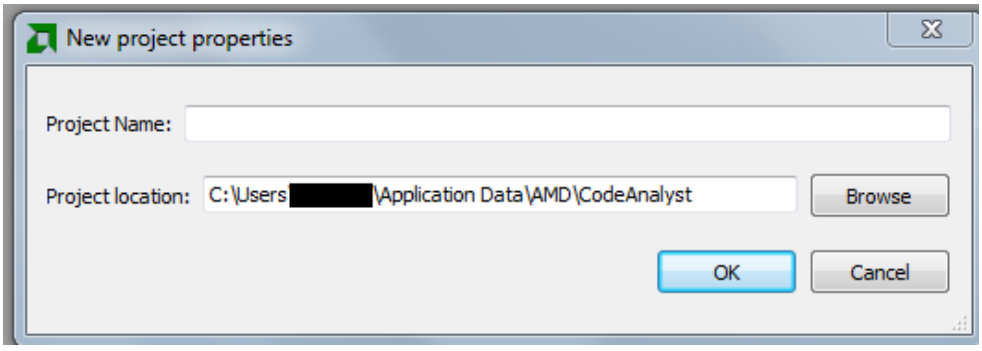
Allgemeine Infos zum Tool:

http://developer.amd.com/tools-and-sdks/archive/compute/amd-codeanalyst-performance-analyzer/

(Diese Doku basiert auf der zum Zeitpunkt aktuellen Version: AMD CodeAnalyst v3.8)

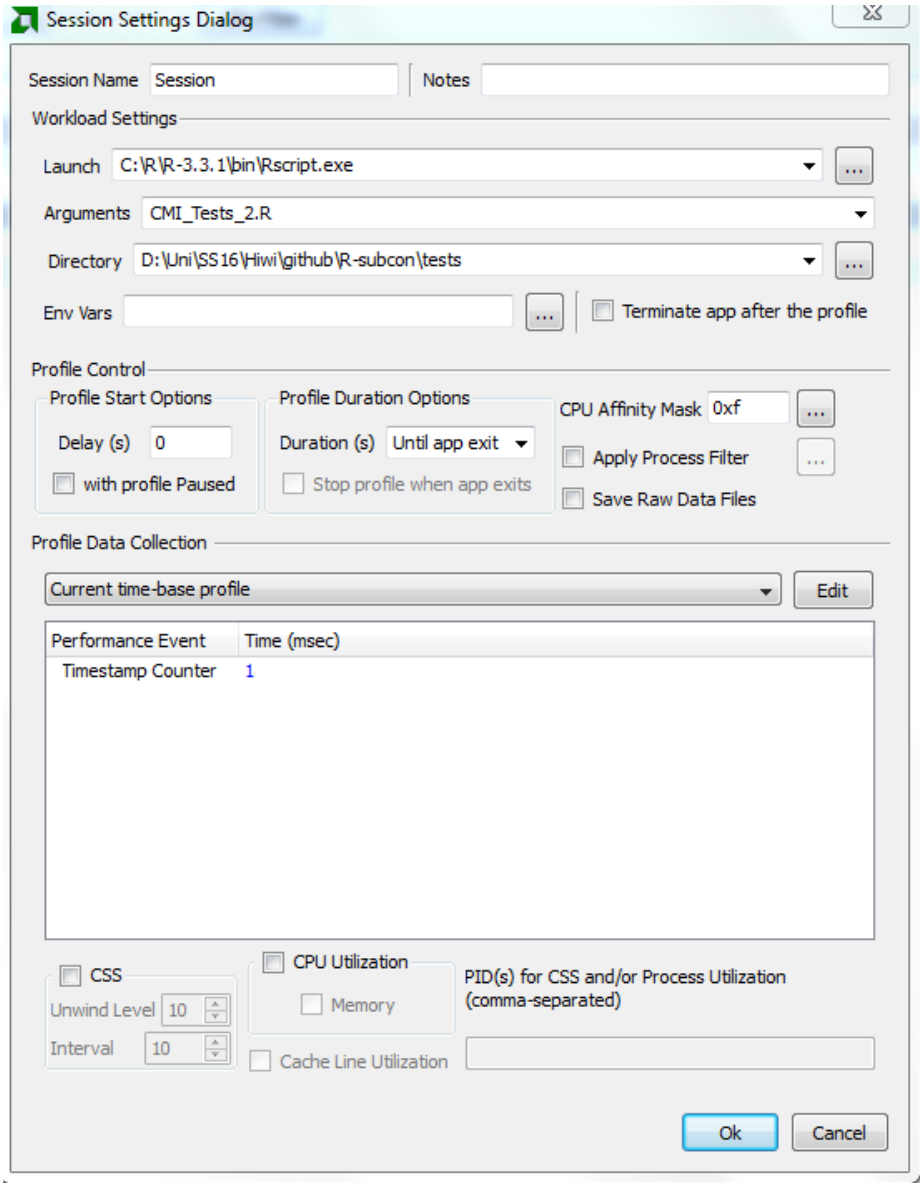
2.3. Projekt und Session einrichten

1) Projekt



2) Session

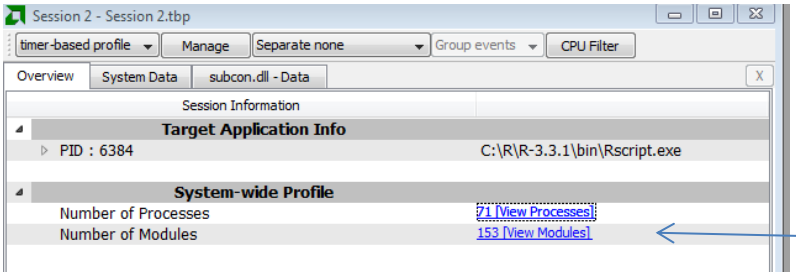
Launch:	Pfad zur Rscript.exe, bei mir: C:\R\R-3.3.1\bin\Rscript.exe
Directory & Arguments:	Pfad und Datei die analysiert werden sollen
Profile Duration:	Until app exit



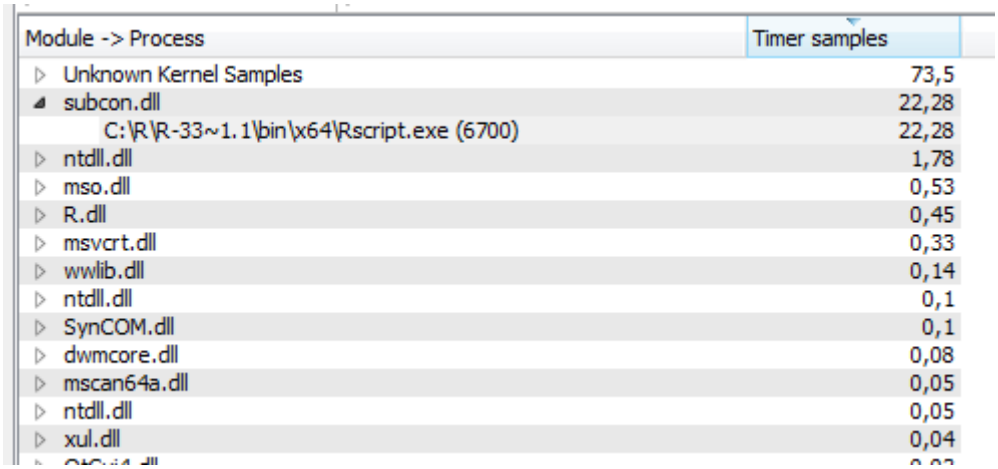
Dann Profiling starten mit: 

2.4. Analyse

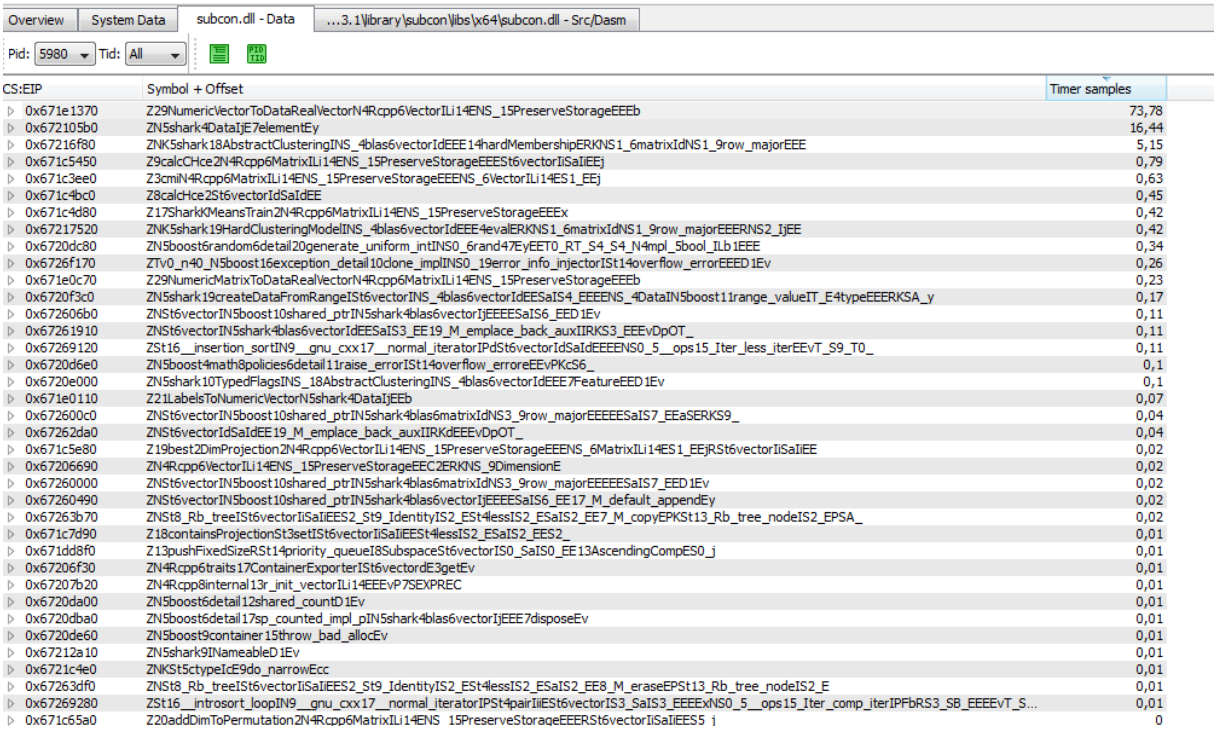
Klick auf die Modules



Per Klick navigieren



Module -> Process	Timer samples
Unknown Kernel Samples	73,5
subcon.dll	22,28
C:\R\R-33~1.1\bin\x64\Rscript.exe (6700)	22,28
ntdll.dll	1,78
mso.dll	0,53
R.dll	0,45
msvcrt.dll	0,33
wwlib.dll	0,14
ntdll.dll	0,1
SynCOM.dll	0,1
dwmcore.dll	0,08
mscan64a.dll	0,05
ntdll.dll	0,05
xul.dll	0,04



Overview | System Data | subcon.dll - Data | ...3.1\library\subcon\libs\x64\subcon.dll - Src/Dasm

Pid: 5980 Tid: All

CS:EIP	Symbol + Offset	Timer samples
0x671e1370	Z29NumericVectorToDataRealVectorN4Rcpp6VectorILi14ENS_15PreserveStorageEEEb	73,78
0x672105b0	ZN5shark4DataIjE7elementEy	16,44
0x67216f80	ZNK5shark18AbstractClusteringINS_4blas6vectorIdEEE14hardMembershipERKNS1_6matrixIdNS1_9row_majorEEE	5,15
0x671c5450	Z9calcCHce2N4Rcpp6MatrixILi14ENS_15PreserveStorageEEESt6vectorIiSaIiEEj	0,79
0x671c3ee0	Z3cmiN4Rcpp6MatrixILi14ENS_15PreserveStorageEEENS_6VectorILi14ES1_EEj	0,63
0x671c4bc0	Z8calcHce2St6vectorIdSaIdEE	0,45
0x671c4d80	Z17SharkKMeansTrain2N4Rcpp6MatrixILi14ENS_15PreserveStorageEEEx	0,42
0x67217520	ZNK5shark19HardClusteringModelINS_4blas6vectorIdEEE4evalERKNS1_6matrixIdNS1_9row_majorEEERNS2_IjEE	0,42
0x6720dc80	ZN5boost6random6detail20generate_uniform_intINS0_6rand47EyEET0_RT_S4_S4_N4mpl_5bool_ILb1EEE	0,34
0x6726f170	ZTv0_n40_N5boost16exception_detail10clone_implINS0_19error_info_injectorISt14overflow_errorEEED1Ev	0,26
0x671e0c70	Z29NumericMatrixToDataRealVectorN4Rcpp6MatrixILi14ENS_15PreserveStorageEEEb	0,23
0x6720f3c0	ZN5shark19createDataFromRangeISt6vectorINS_4blas6vectorIdEESaIS4_EEEENS_4DataIN5boost11range_valueIT_E4typeEEERKSA_y	0,17
0x672606b0	ZNSt6vectorIN5boost10shared_ptrIN5shark4blas6vectorIjEEEESaIS6_EED1Ev	0,11
0x67261910	ZNSt6vectorIN5shark4blas6vectorIdEESaIS3_EE19_M_emplace_back_auxIIRKS3_EEEvDpOT_	0,11
0x67269120	ZSt16__insertion_sortIN9__gnu_cxx17__normal_iteratorIPdSt6vectorIdSaIdEEEENS0_5__ops15_Iter_less_iterEEvT_S9_T0_	0,11
0x6720d6e0	ZN5boost4math8policies6detail11raise_errorISt14overflow_erroreEEvPKcS6_	0,1
0x6720e000	ZN5shark10TypedFlagsINS_18AbstractClusteringINS_4blas6vectorIdEEE7FeatureEED1Ev	0,1
0x671e0110	Z21LabelsToNumericVectorN5shark4DataIjEEb	0,07
0x672600c0	ZNSt6vectorIN5boost10shared_ptrIN5shark4blas6matrixIdNS3_9row_majorEEEESaIS7_EEaSERKS9_	0,04
0x67262da0	ZNSt6vectorIdSaIdEE19_M_emplace_back_auxIIRKdEEEvDpOT_	0,04
0x671c5e80	Z19best2DimProjection2N4Rcpp6VectorILi14ENS_15PreserveStorageEEENS_6MatrixILi14ES1_EEjRSt6vectorIiSaIiEE	0,02
0x67206690	ZN4Rcpp6VectorILi14ENS_15PreserveStorageEEC2ERKNS_9DimensionE	0,02
0x67260000	ZNSt6vectorIN5boost10shared_ptrIN5shark4blas6matrixIdNS3_9row_majorEEEESaIS7_EED1Ev	0,02
0x67260490	ZNSt6vectorIN5boost10shared_ptrIN5shark4blas6vectorIjEEEESaIS6_EE17_M_default_appendEy	0,02
0x67263b70	ZNSt8_Rb_treeISt6vectorIiSaIiEES2_St9_IdentityIS2_ESt4lessIS2_ESaIS2_EE7_M_copyEPKSt13_Rb_tree_nodeIS2_EPSA_	0,02
0x671c7d90	Z18containsProjectionSt3setISt6vectorIiSaIiEESt4lessIS2_ESaIS2_EES2_	0,01
0x671dd8f0	Z13pushFixedSizeRSt14priority_queueI8SubspaceSt6vectorIS0_SaIS0_EE13AscendingCompES0_j	0,01
0x67206f30	ZN4Rcpp6traits17ContainerExporterISt6vectordE3getEv	0,01
0x67207b20	ZN4Rcpp8internal13r_init_vectorILi14EEEvP7SEXPREC	0,01
0x6720da00	ZN5boost6detail12shared_countD1Ev	0,01
0x6720dba0	ZN5boost6detail17sp_counted_impl_pIN5shark4blas6vectorIjEEE7disposeEv	0,01
0x6720de60	ZN5boost9container15throw_bad_allocEv	0,01
0x67212a10	ZN5shark9INameableD1Ev	0,01
0x6721c4e0	ZNKSt5ctypeIcE9do_narrowEcc	0,01
0x67263df0	ZNSt8_Rb_treeISt6vectorIiSaIiEES2_St9_IdentityIS2_ESt4lessIS2_ESaIS2_EE8_M_eraseEPSt13_Rb_tree_nodeIS2_E	0,01
0x67269280	ZSt16__introsort_loopIN9__gnu_cxx17__normal_iteratorIPSt4pairIiiESt6vectorIS3_SaIS3_EEEExNS0_5__ops15_Iter_comp_iterIPFbRS3_SB_EEEEvT_S...	0,01
0x671c65a0	Z20addDimToPermutation2N4Rcpp6MatrixILi14ENS_15PreserveStorageEEERSt6vectorIiSaIiEES5_i	0

3. Weitere Optionen einer Performance-Analyse

1) Very Sleepy- C/C++ **CPU profiler** for Windows systems

   http://www.codersnotes.com/sleepy/

2) CPU profiler used at Google

   http://goog-perftools.sourceforge.net/doc/cpu_profiler.html

http://stackoverflow.com/questions/23685206/is-my-using-gperftools-to-profile-a-r-script-with-rcpp-correct