

# UNIVERS PROFILER

## Accurate performance analyzer

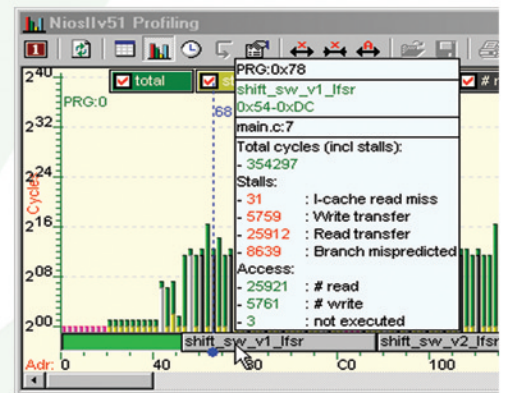
### INTRODUCTION

The Univers profiler helps the software engineer to fully understand the performance bottlenecks of the software implementation. The profiler provides a rich set of information. This information is first of all extremely useful to determine where optimizations are most effective. Secondly smaller parts of the code can be optimized based the information from the profiler.

Several views are user selectable to chose between a global overview or detailed information. Within such a view the user can select to include or exclude certain timing information. For each software procedure but also for each individual instruction the total amount of cycles, including a detailed list of the cycle contribution, is provided. Stall cycles can contribute highly to the total amount of cycles. Each stall cause is individual monitored and viewed. Stall causes are for instance cycles which are added due to cache misses or branch miss predictions or memory collisions.

#### Features:

- Different views with user selectable information
- Detailed cycle information including stall causes
- Cycle information is presented on procedural level or on instruction level or on user selection level
- Direct link to 'C' Application window, to Disassembly window and to Memory window of Univers.
- No costly resources required (timer, data storage, etc)
- No code changes required for profiling purposes. The real source code is analyzed; eliminating risks



### BENEFITS

A very important benefit of this profiler is the fact that no system resources are used. The disadvantage of using resources such as a timer or data storage, means that they must be available within the system. The biggest disadvantage of using a timer based profiler is the questionable accuracy of such a profiler. The Univers profiler is 100% based on simulation where the CPU model and attached peripherals provide the timing information. This method is accurate and does not require system resources.

Another very important benefit of this profiler is that the software which is under investigation does not need to be changed. This profiler does not add code in any way to the application code for profiling purposes. As a result it is guaranteed that the code which is being profiled is the exact production code.

### PROFILER VIEWS

The Univers profiler contains several views:

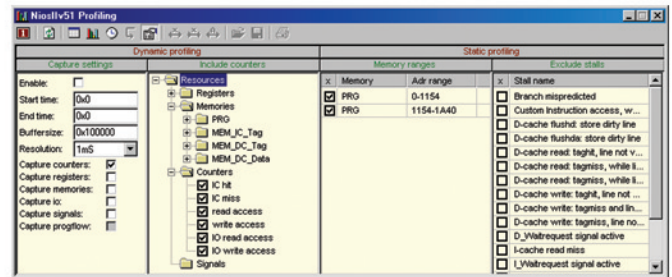
- Settings/Properties view
- Tabular view
- Graphical views
- Pop up information boxes
- User selectable profile area

# Profiler views

## SETTINGS

The monitored and showed profile information is fully user configurable. The settings window provides a centralized overview about which data should be incorporated in the analysis:

- Static profiler
  - Include/Exclude memory areas
  - Include/Exclude C procedures
  - Include/Exclude specific stall reasons
- Dynamic profiler
  - Select on which resource
  - Select duration and data pool size



## TABULAR VIEW

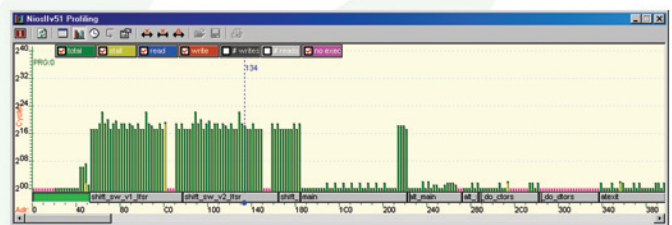
The tabular view provides a total overview of all executed cycles related to software procedures and memory addresses. The total number of calls to a certain software procedure is easily examined as well as the number of external read and write transactions caused by this procedure.

| Procedure         | PC        | calls | cycles | stalls | %     | read cnt | write cnt | # reads | # writes |
|-------------------|-----------|-------|--------|--------|-------|----------|-----------|---------|----------|
| shift_sw_v1_lifer | 0:54-DC   | 5292  | 687960 | 15876  | 46.91 | 0        | 0         | 10584   | 47628    |
| shift_sw_v2_lifer | 0:DC-168  | 5292  | 677373 | 0      | 46.19 | 0        | 0         | 10584   | 47628    |
| shift_hw_lifer    | 0:168-188 | 5292  | 63504  | 0      | 4.33  | 0        | 0         | 5292    | 5292     |
| main              | 0:188-224 | 1     | 37094  | 0      | 2.52  | 0        | 0         | 13      | 8        |
| alt_dev_list      | 0:224-22C | 1     | 2      | 0      | 0.00  | 0        | 0         | 1       | 0        |
| alt_ticks         | 0:224-228 | 1     | 1      | 0      | 0.00  | 0        | 0         | 0       | 0        |
| alt_main          | 0:224-274 | 1     | 34     | 0      | 0.00  | 0        | 0         | 4       | 3        |
| alt_tick_rate     | 0:224-228 | 1     | 1      | 0      | 0.00  | 0        | 0         | 0       | 0        |
| alt_sys_init      | 0:274-28C | 1     | 10     | 0      | 0.00  | 0        | 0         | 1       | 1        |
| _do_ctors         | 0:28C-2E4 | 1     | 26     | 3      | 0.00  | 0        | 0         | 3       | 3        |
| _CTOR_END_        | 0:28C-290 | 1     | 1      | 0      | 0.00  | 0        | 0         | 0       | 0        |
| _CTOR_LIST_       | 0:28C-290 | 1     | 1      | 0      | 0.00  | 0        | 0         | 0       | 0        |
| atexit            | 0:33C-3D8 | 1     | 47     | 3      | 0.00  | 0        | 0         | 5       | 6        |

This view is extremely useful to pinpoint which procedure(s) contribute most to performance bottlenecks of the application. The shown information contributes highly to decide which part of the code has to be improved, to effectively improve the performance.

## GRAPHICAL VIEWS

The static profiler shows user selectable cycle information related to memory addresses of program memory and data memory. Software procedures located on those addresses are shown when applicable. Pop up boxes provide additional information per instruction or per software procedure.

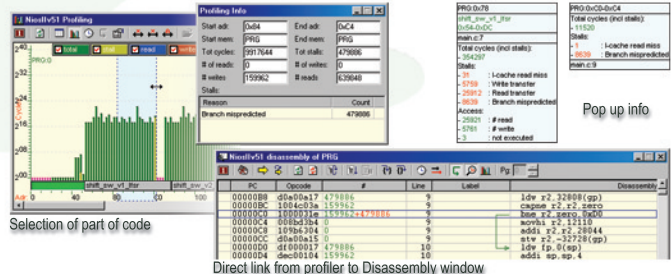


This view is extremely useful to optimize the code by eliminating branch miss predictions, etc. The direct link with the Application window, Disassembly window and Memory window guarantee fast progress. It is possible to simply jump to the C-source line which causes the branch miss prediction, etc.

## SELECTIONS

Selections can be made to accumulate the cycle information over a specific range of instructions. This is a quick method to know the performance of loops within procedures.

Pop up windows provide detailed information on procedural level and on individual instruction level.



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