Using R**VS** to support multicore timing analysis

The Rapita **Verification Suite** (R**VS**) provides an automated tool framework to support DO-178C Multicore Certification (CAST-32A / A(M)C 20-193). Together, its various plugins support different parts of the compliance workflow:

- Rapi**Test** produces multicore test harnesses from input characterization tests and Rapi**Daemons** and runs these on the target platform

- Rapi**Time** instruments multicore code so timing results and values from performance monitoring counters can be collected during tests, and supports the analysis of these metrics

- Rapi**Task** instruments multicore code so task-level scheduling results can be collected during tests, and supports the analysis of scheduling behavior
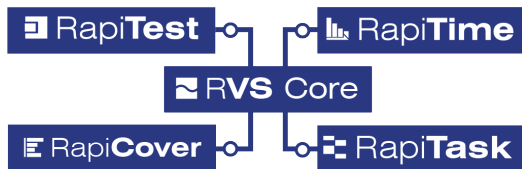
Easily analyze multicore performance metrics

R**VS** supports the analysis of multicore performance by supporting the collection of timing results as well as additional metrics from multicore systems, including cache, memory and bus accesses and cache misses. It makes it easy to analyze these results by letting you filter to show only specific tests or metrics, and by letting you select a baseline test against which to compare differences.
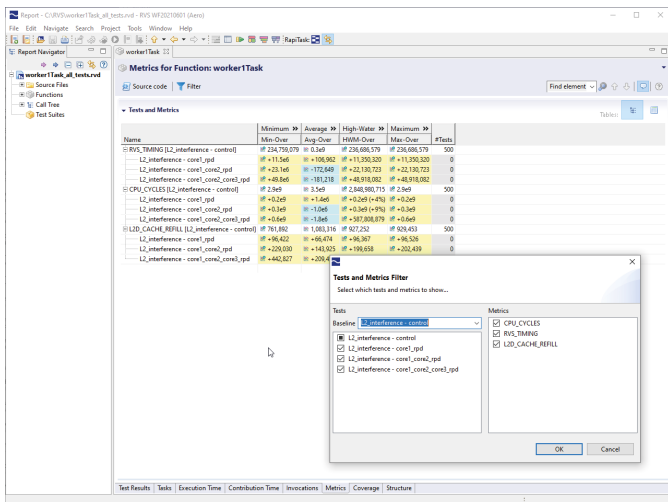

Analyze performance metrics and set baselines to reduce analysis effort

Capture values from hardware event monitors

Rapi**Time**, an integral part of **MACH**[178] and the Multicore Timing Solution, lets you capture and view values from hardware event monitors (HEMs) on your hardware, which helps you understand the types of operations performed by your application, such as:

- L1/L2 Cache Accesses

- L1/L2 Cache Misses

- Main Memory Accesses

- Shared Bus Accesses

- Number of Instructions Executed

- CPU Cycles

- Unaligned Accesses

Collecting values from HEMs helps you understand your system's behavior in more detail, and is especially important for supporting multicore timing analysis.
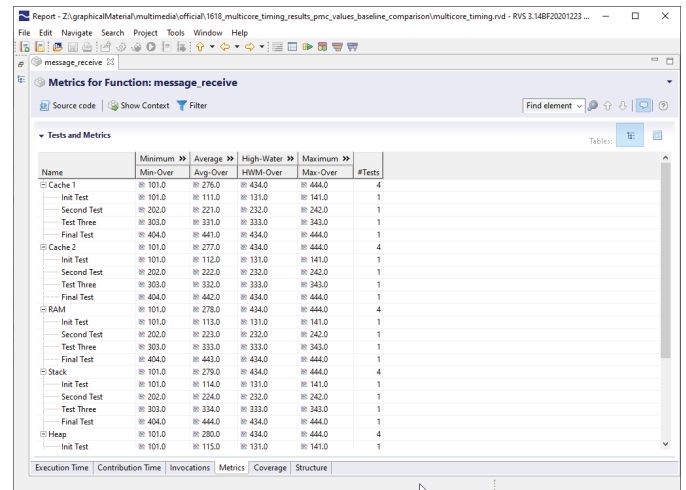

Capture values from HEMs to understand the impact of multicore interference

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Automatically merge timing results

Timing analysis requires the collection of large amounts of data from many test runs on your system and this is especially true for multicore timing analysis.

Rapi**Time** lets you merge timing results from multiple test runs, allowing you to collect data in parallel from multiple platforms or at different time points and collate your testing scenarios for multicore timing analysis typically require the collection of values of various HEMs during execution. HEMs that must be collected can vary between different test runs.
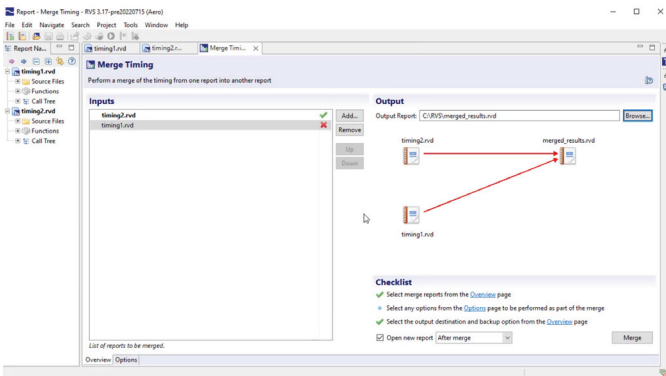
RapiTime makes it easy to merge timing results from multiple test runs allowing you to collect data in parallel from multiple platforms

Custom exports

R**VS** lets you generate custom exports that include only the results you need to satisfy your test scenario. To create custom exports, you generate a template file in which you can add text, link to your requirements and test plans, and include R**VS** results through an API. You can then generate a report containing only the results you need each time you run your tests.
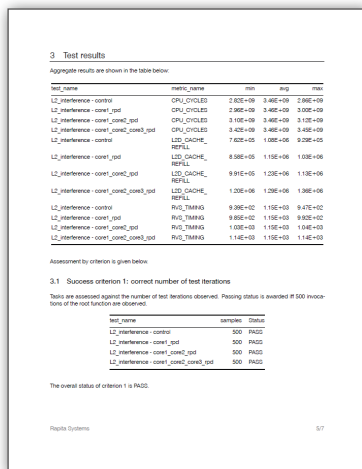

RVS allows you to generate custom reports for results from your multicore timing analysis

Rapi**Daemons**

Rapi**Daemons** are small applications that run on multicore hardware and generate intentional contention on specific resources within the system.

Each Rapi**Daemon** targets a specific resource, for example caches, interconnects, memory and other on-chip or off-chip shared resources. This lets you identify and quantify the effects of multicore interference by running different Rapi**Daemons** in different configurations.

Rapi**Daemons** and characterization tests are used as inputs to generate tests that can run on a multicore platform to collect results using R**VS**.
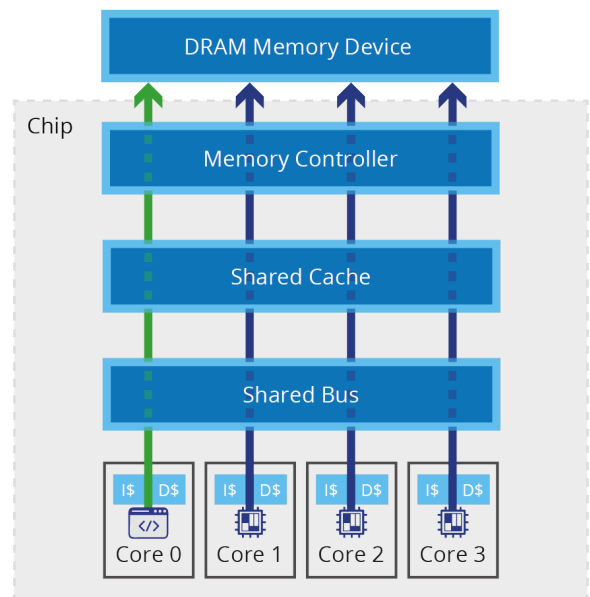
Application running on core

Rapi**Daemon** running on core

Application resource usage

Contention through Rapi**Daemons**

RapiDaemons apply configurable levels of contention to specific hardware resources

Find out more

If you want to find out more about multicore timing analysis, visit our website where you can access a wide range of white papers and videos on this topic.

www.rapitasystems.com/multicore-timing

Rapita Systems regularly releases new material and runs training courses on multicore timing analysis worldwide. To make sure you are notified, sign up to our mailing list.

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