

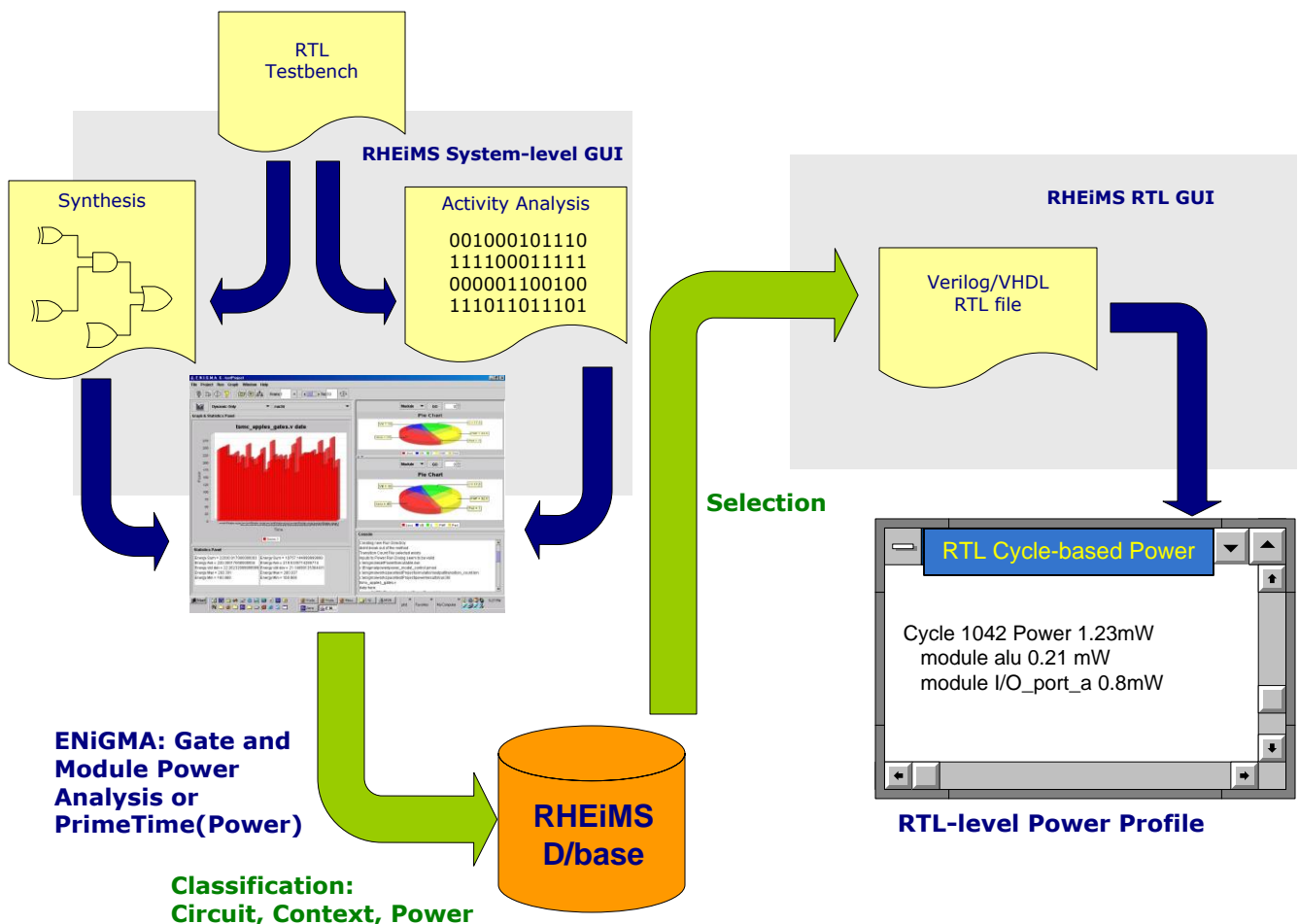
RHEiMS-PRTL RHEiMS Power for Register Transfer-Level

The power-models that are produced by the system-level RHEiMS tool can also be integrated into normal RTL-level simulations and used for cycle based-power analysis. Due to the different simulation environment only cycle-based or data-driven cases in the RHEiMS power-model database are appropriate. The speed performance of power estimation at this level of RHEiMS-PRTL is determined by that of the RTL simulation, since identically to system-level RHEiMS, it operates within the context of the normal simulation platform.

RHEiMS-PRTL has the following unique features.:

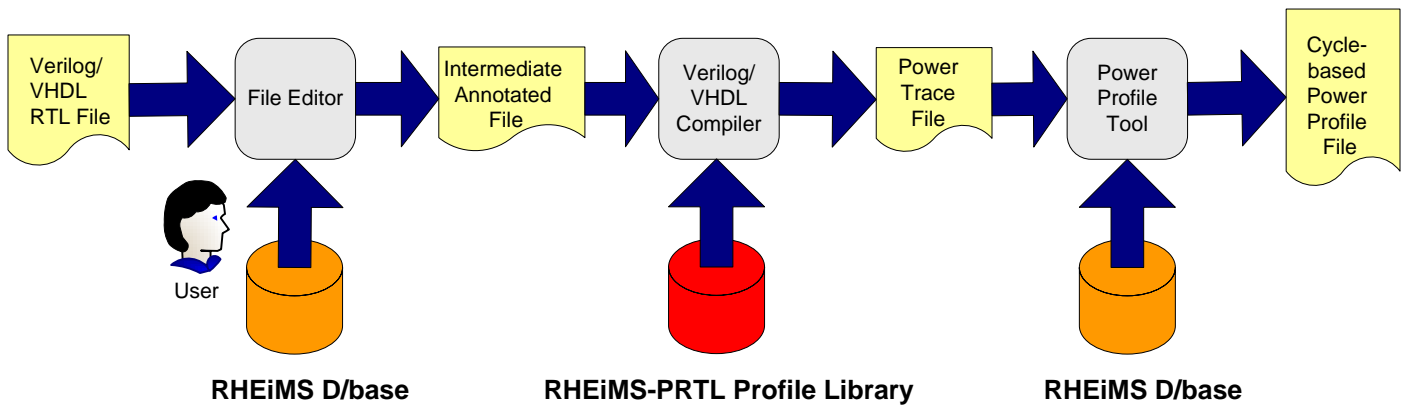
- **Accurate power assessment** in a Timed/Cycle-based domain **2 orders of magnitude faster** But **within 1.5% accuracy of gate-level power estimation**.
- Consistency and integrity of power estimation between system and register-levels since the same model is used in both instances.
- **Rapid evaluation** of various RTL-relevant optimisations that can further **reduce a system-level circuit's power consumption by up to 20%**.

In RHEiMS-PRTL the generation of cases to populate the RHEiMS database is identical to the RHEiMS system-level power estimation tool. The same **Classification process** and editor is used in both cases. The only difference is in the Selection process. In RHEiMS-PRTL, a Verilog or VHDL RTL file is annotated instead of a system-level file and only cases appropriate to RTL simulation can be chosen from the database.



The RHEiMS-PRTL GUI

The RHEiMS-PRTL GUI operates with RTL-level languages such as Verilog and VHDL. The System engineer can investigate and query the RHEiMS database containing all the classified cycle-based or data-dependent cases generated from previous designs and simulation runs. The RTL-level code is **annotated** with the various designer-selected choices from the database. The RTL file is compiled with the normal compiler that is linked to the RHEiMS-PRTL RTL library which enable power tracing from the simulation, The behaviour of the annotated file is identical to that of the original file, except that a power profile can be generated from the trace file using the RHEiMS-PRTL Power Profiler tool and RHEiMS database.



The RHEiMS-PRTL system provides an adaptable and comprehensive power modelling capability with customisable conditions. Furthermore, all or many of the cases used in the power estimation will have already been generated for use in the system-level analysis:

- **Static Cases** in which the power consumption of associated component and action is not data dependent.
- **Dynamic Cases** in which the power consumption is data dependent and the data stream is specified in a file or memory structure.
- Alternative operational conditions such as **frequency** and **voltage** can be specified for each case.

RHEiMS Value Proposition

- RTL power estimation two orders of magnitude faster but within 1.5% accuracy of gate-level power estimation.
- Power optimisation of a system-level design that can reduce power consumption by a further 20%.
- An easy, rapid and accurate power assessment environment for RTL designs.