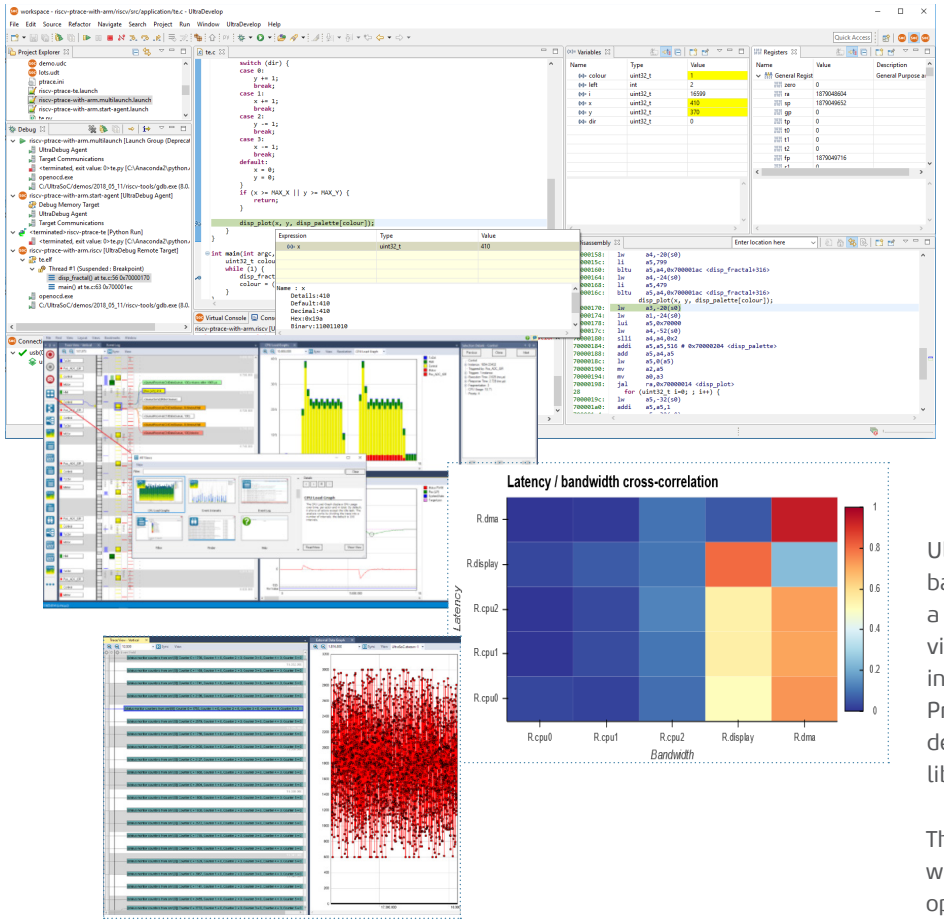
UltraDevelop 2 Tools Suite

UltraSoC provides a comprehensive suite of software tools to support users of its embedded monitoring and analytics IP. UltraDevelop 2 is a complete Eclipse-based integrated development environment (IDE) that combines heterogeneous multi-core debug, run control, and performance tuning with advanced visualization and data science capabilities. Incorporating technology from UltraSoC partners Imperas and Percepio, UltraDevelop 2 provides actionable insights to cut development costs, shorten time-to-revenue and improve product quality.



UltraDevelop 2 delivers a holistic, system-level approach to SoC development and debug, allowing engineers to view and analyze the interlinked behavior of hardware, firmware and software at any level of abstraction

It provides an integrated view that encompasses single step and breakpoint code execution status for up to 16 processors (which may be based on dissimilar architectures); instruction trace; and real-time, protocol aware monitoring of hardware structures within the SoC.

Engineers can simultaneously view the behavior of hardware structures such as memory controllers and interconnects / NoCs, and the execution of software, all across a number of different cores.

UltraDevelop 2 is available in two configurations: the base version is ideal for simpler systems and provides a simple, intuitive way of capturing, processing and viewing data acquired via the UltraSoC embedded analytics infrastructure. The fully featured configuation, UltraDevelop Pro, includes full multicore debug based on the Imperas MPD debugger; visualization via Percepio's Tracealyzer tool; and library-based and (Python) scriptable data science facilities.

The tools leverage standard interfaces and data formats wherever possible, and are available for Linux and Windows operating systems

At-a-glance

- **Integrated view of hardware / software**
- **Heterogeneous multicore support**
  - Simultaneous debug control of up to 16 cores
- **Support for more than 20 CPU architectures**
- **Advanced data science and visualization**
- **Eclipse-based, extensible**
- **Reveals hard-to-find bugs, deadlocks**
- **Extensible, configurable**
  - UltraDevelop 2 (single-core)
  - UltraDevelop Pro (multicore, data science features

Functional overview

UltraDevelop 2 provides hardware, software and firmware teams with an efficient, easy-to-use tool suite that gives them intimate visibility of the operation of hardware and software within an SoC. It provides:

- Fully featured multicore run control
- Presentation of data from UltraSoC on-chip monitors
- Post-processing and visualization capabilities
- Configuration of UltraSoC on-chip analytics IP

Debug

UltraDevelop 2 includes a library of debug adapters (based on OpenOCD) to enable real-time run control of more than 20 processor core architectures from multiple vendors, including Arm, MIPS and RISC-V (as implemented by Andes, Esperanto and SiFive), amongst others.

For simpler systems, the tools are provided with the open source gdb debugger.

For more complex multicore systems, MPD (from Imperas) allows UltraDevelop Pro users to simultaneously debug multiple application processors, including single core, multi-core and multi-threaded variants. Peripherals can be debugged at the same time as the application, letting the developer see the peripherals operating in the context of the platform and the application code, and further extending the hardware/software co-development capabilities within UltraDevelop Pro.

Visualization

The inclusion of Percepio's Tracealyzer within UltraDevelop Pro brings powerful data analytics and visualization capabilities to the UltraDevelop suite, marrying the worlds of hardware and software development. The Tracealyzer tool 'understands' the meaning of high-level events within software or an RTOS, connecting related events and views, and complementing the information gathered via UltraSoC's hardware monitors with a highly intuitive, visual perspective on system level operation. This integrates a very fast and compact database, allowing trace files of terabytes to be efficiently displayed, filtered or analyzed.

Data science extensions

UltraDevelop Pro includes a suite of modules that facilitate detailed big data analysis of on-chip behavior, including anomaly detection, heat mapping and root cause analysis. These include example applications and configurations for functional safety (for example ISO26262); cybersecurity; and performance optimization (for example identifying inefficiencies in multi-threading software stacks, and hard-to-find states that lead to "long-tail" bugs in high-performance computing environments).

UltraDevelop Pro users can extend these capabilities, customize the framework and configure test systems via a range of scripted (Python) modules that give direct access to the data provided by UltraSoC on-chip monitors. These also provide configuration options and higher-level functionality such as terminal services.

Third party tools support

The choice of the Eclipse framework as the basis for UltraDevelop 2 makes the tools inherently flexible and extensible. In addition, UltraSoC partners with a number of third party tools vendors, including Cadence; CEVA; Green Hills Software; IMG Systems; Lauterbach; Mentor; Synopsys; and Teledyne LeCroy.

Product Features

- **Eclipse-based IDE**
- **Integrated view of real-world operation of hardware, firmware, software**
- **High level data analysis via Percepio Tracealyzer**
- **Scriptable data science extensions**
- **Heterogeneous multicore debug via Imperas MPD**
  - Up to 16 different cores / architectures
- **GDB debugger for simpler systems**
- **CPU run control**
  - Breakpoints, performance monitoring, trace, cross triggering, etc
  - Optimized support for multiple CPUs via OpenOCD
- **Discovery and configuration of UltraSoC on-chip IP**
- **Standards-based**
  - MI, RSP, CTF, TCF
  - Python + libraries (Pandas/NumPY/Scikit/SKLearn) + Jupyter
- **Easy integration of third-party tools**
- **Windows / Linux support**