Virtual Platforms from OVP™

OVP is becoming the de facto source of open source high performance processor core models for use in simulation. OVP also has a large and growing collection of models of behavioral/peripheral models.

The Virtual Platforms available from OVP make use of the processor core and peripheral models to provide simulations of reference boards and examples that run cross compiled binaries of application software and operating systems.

OVP provides virtual platform models of many different platforms from simple '**bare metal**' platforms that are really just processor core and memory, through to commonly used embedded software **development boards for ARM and MIPS** processors that boot standard operating systems like Linux, Android, Mentor Nucleus, uClinux, freeRTOS, and Micrium uC-OS.

All the models and platforms development by Imperas are provided under a modified Apache 2.0 open source license. Some peripheral models used in the platforms are from other sources and in that case they are licensed under the open source license provided with them.

Visit **www.OVPworld.org** to download models and simulator

OVP Components

OVP has three main components:

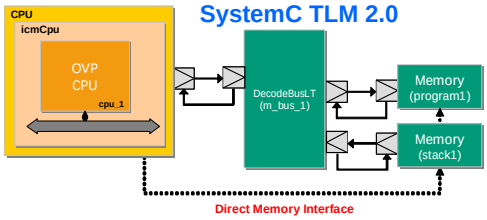
- the OVP APIs that enable a C model to be written
- a library of open source models
- OVPsim: a simulator that executes these models

Use OVP to put together a simulation model of a platform and connect it to your debugger to provide a very efficient fast embedded software development environment.

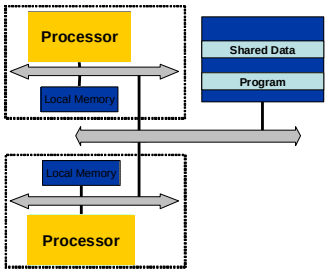
Bare Metal Platforms

For most processor families several bare metal OVP platforms are developed showing usage of 1 processor core, 2 cores, and 24 cores. These show how a platform is constructed and how cross compiled application software is loaded onto the platform and the how the platform is run. There are also examples of multi-core platforms.

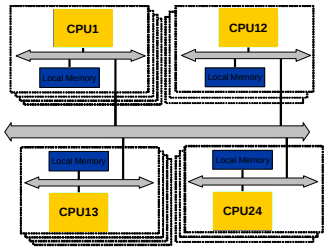
These platforms are available as C, C++ and SystemC TLM-2.0. The source of the platforms is provided. Often the bare metal platforms are coded to enable specific processor family variants to be selected without any re-compilation of the platform. A GNU GDB debugger can be connected to one processor core.



SINGLE CORE



MULTI-CORE



MANY-CORE

OVP™ Performance

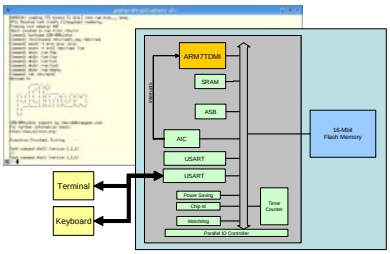
OVP processor core models run fast, very fast. 100s and 1,000s of millions of instructions per second. OVPsim™, the execution engine for these models, uses state of the art code morphing simulation technology to get this performance. This applies not only to single core processors, but also to the leading edge multicore processors from ARM and MIPS. This industry leading performance is not just available in simple benchmarks. For example, an OVP virtual platform will boot Linux in less than 10 seconds.

SystemC Integration

Many development teams have adopted SystemC for virtual platform behavioral and peripheral components, utilizing IEEE 1666 compliant simulators. All OVP processor core models include a native SystemC/TLM-2.0 interface, enabling easy use in SystemC simulation environments. In fact, OVP models have been used with the OSCI simulator, as well as with the SystemC simulators from all the major vendors.

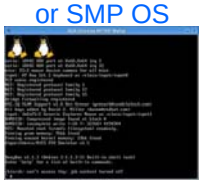
 www.imperas.com

Example OVP OS Ready Platforms for Embedded Software Development



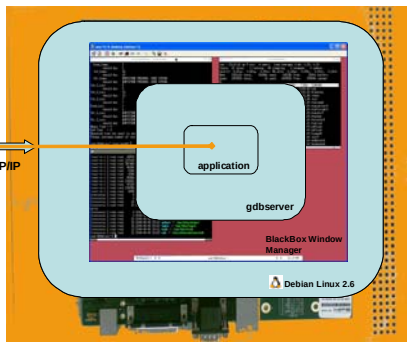
Atmel AT91SAM7 boots uClinux on ARM

Single Core or SMP OS



Visit **www.OVPworld.org** to download models and simulator

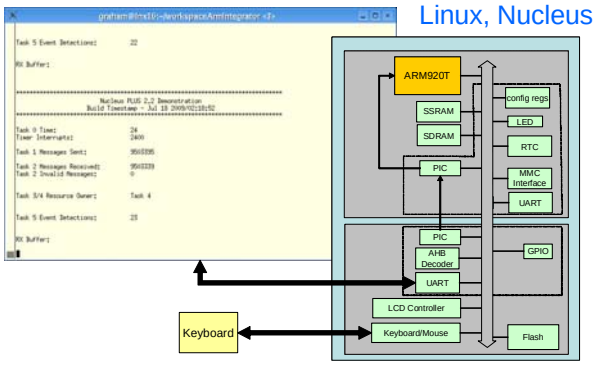
gdbserver, GDB, Eclipse/CDT etc Host



Virtual Platform as Remote Target

MIPS Malta that boots Linux, Nucleus used for application development

ARM IntegratorCP that boots Linux, Nucleus



Each example OVP virtual platform comes with full source of all models and platform, and can be in C or SystemC TLM2.0. The examples also include binary images of the OS and scripts to start the simulation.

Wiki Site for Latest Information

On the OVP web site there are over 20 sections in the library wiki that introduce the different platforms, provide usage notes, and special download buttons for platform specifics.

These include downloading reference examples of the platforms as source, and also in many cases pre-compiled binaries of the platform, run scripts, and operating systems.

Instructions for re-compiling the platforms are also given.

For the MIPS Malta there are full instructions on installing a complete Debian distribution on the simulated Malta platform. The MIPS Malta can be used in single core mode or in SMP mode with the MIPS32 34K cores.

Cross Compilers

The OVP web site also includes pre-compiled GNU GCC tool chains for the different OVP supported processors and platforms.

Other Virtual Platforms

On the OVP Library wiki users can upload their own platforms, models and instructions.

One example is the OCP-IP virtual platform using OVP models, that supports the Open Core Protocol and demonstrates the OCP-IP SystemC TLM-2.0 Modeling Kit.

Another virtual platform example is a Sibridge Technology platform that uses a USBHost model to decompress audio on a simulated MIPS core and play the sound through the host PC's speakers.

Benefits of Virtual Platforms for Embedded Software Development

Virtual platforms lower software development costs, increase quality and reduce the risks involved with the software development side of delivering advanced electronic systems. This is accomplished by enabling:

- ✓ Ability to run the real hardware executables on the virtual platform
- ✓ Early start of software development and hardware-software integration
- ✓ Accessibility of the virtual platform for the entire development team, no matter the location
- ✓ Full visibility and controllability of the simulation environment
- ✓ Repeatable, deterministic simulation makes debugging easier
- ✓ Flexibility of the virtual platform to easily accommodate changes in the specification
- ✓ Ability of the virtual platform to connect to real world resources