MIPS Software Overview

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Welcome to the Software Overview section of the MIPS Software Training course. In this section I will discuss software and software tools you can use in developing software for MIPS Cores

Overview Of All MIPS Software

- MIPS Software tools are divided between:
  - Those supplied and supported by companies outside of MIPS
  - Those developed and supported by MIPS

I want to make a distinction between some of the tools I will be talking about in this section.

+ MIPS works closely with several out side vendors who directly support MIPs cores with their tools. These tools are supplied and supported directly by these vendors.

+ MIPS also develops, sells and directly supports Software tools, such as Navigator ICS, in-house.

Cross development Tools

- MIPS Navigator ICS
  - Software included:
    - Eclipse IDE with CDT plug-in
    - Sourcery G++
    - MIPS Core Simulators
    - Malta Board support
    - System Navigator Probe for EJTAG support
  - Can be integrated with the Arriba Debugger
  - May be purchased online at www.mips.com

One of the tools MIPS has developed is a product called Navigator Integrated Component Suite. This is a collection of several tools into one convenient package.

The software that is included in this package is

+ An eclipse IDE with a CDT plug-in. For those of you the may not be familiar with eclipse it is a tool used to develop, build, launch and debug applications. Eclipse is a highly extensible platform which was originally designed for Java development but can be extended through its plug-in interface. CDT is one such plug-in the extends Eclipse for C and C++ development tools. MIPS adds additional support for MIPS specific development.

+ CodeSourcery SG++ GNU-based Toolchains for MIPS® cores. These tools contain C and C++ compilers and development tools to create applications for non OS or Linux environments.

+ There are MIPS core simulators that are designed to emulate the CORE sold by MIPS. These come in two flavors one that is a fast instruction set simulator suitable for application debugging and another that adds performance information suitable for benchmarking.

+ A board support package is provided for the MIPS Malta evaluation development platform. This platform is a FPGA based CPU that can be build with specific MIPS Core options.

+ You can also add on our system Navigator EJTAG probe and supporting software.

Cross development Tools

- CodeSourcery G++ Lite
  - Free edition
  - Command line only
  - No support included

There is a free version of the CodeSourcery G++ tool chain available on the CodeSourcery web site.

+ It has a command line only interface and cannot be used with Navigator ICS.

+ There is no support for this product

Cross development Tools

- Green Hills® Multi IDE
  - Professional product fully supported by GHS
    - Enhanced to support MIPS Cores
    - Malta Board and simulator support
    - SuperTrace^{tm} Probe compatible
    - Advanced features to support their RTOS
    - Available at http://www.ghs.com

We work closely with the Green Hills team to keep them up to date on changes and enhancements for our Cores

+ Multi supports is designed to support our Malta evaluation board or simulators

+ You can use the Green Hill SuperTrace Probe

+ and it has advanced features to support the Green Hills RTOS

+ For more information go to www. ghs dot com

Cross development Tools

- Free GNU from the Free Software Foundation
  - Free to use and modify
  - Supported by software community

You can also get the GNU tools from the Free Software Foundation

+ These tools come with source code and you are free to use and modify the tools within the limits of the Free Software Foundation use license.

+These tools are supported only through the Free Software Foundation community.

Linux on MIPS

- LinuxLink By TimeSys™ is a product of TimeSys® that empowers roll-your-own developers to rapidly and efficiently create their own commercial-grade custom Linux platform;
  - For more information: contact them on the Web at http://www.timesys.com/
- MontaVista™ Software "provides a commercial-grade Linux-based operating system and universal development platform" For more information contact them on the web at http://www.montavistasoftware.com

There are several partners the MIPS works with to provide Linux on MIPS cores

+LinuxLink by TimeSys provides a kernel and a tools to customize their Linux distribution

+ MontaVista Software provides their version of the Linux Kernel and a full Linux development platform

Linux on MIPS

- WindRiver® "platforms include Wind River Workbench, an Eclipse-based, end-to- development suite."

- Linux MIPS

    - Free community supported Linux

+ WindRiver Systems also provides a Linux kernel and their WindRiver Work Bench which is also a eclipse based IDE

+ And last there is the linux-mips dot org web site which is the head of the Linux tree for MIPS under the GNU Public License that is community supported.

Other OS Products

- Nucleus® – Mentor Graphics® Eclipse-based Nucleus EDGE toolchain

  http://www.mentor.com/products/embedded_software

- VxWorks® WindRiver®

  http://www.windriver.com/products/platforms

- ThreadX® - expresslogic

  http://www.rtos.com

There are a few other OS products supported by Mentor Graphics, Wind River and express Logic

Co Simulation Tools

- Tools that can completely simulate your entire System

- Seamless® Mentor Graphics
    http://www.mentor.com/products/fv/hwsw_coverification/seamless

- CoWare® Virtual Platforms
    http://www.coware.com

To simulate a full system, MIPS partners with companies to support all MIPS Cores. Each uses a MIPS core simulator provide by MIPS. Two of these companies are Mentor Graphics and CoWare.

Software Simulation

- The MIPS Simulator
  - Emulation of MIPS Cores including Caches and TLB.
  - Can be Cycle Accurate emulating Pipeline effects and used for benchmarking and profiling.
  - Fully Supported and sold by MIPS

MIPS provides a MIPS Core Simulator to its licensees and as part of the Navigator ICS product.

+ This simulator Emulates all aspects of a MIPS Core including caches and TLB

+ There is a version that is cycle accurate that simulates Pipeline and memory effects that is suitable for benchmarking and code profiling.

+ this is directly supported by MIPS

Malta Development Platform

- Standard Base Board with interchangeable Daughter Cards
- Daughter cards can contain an FPGA based Core or a Test Chip as available
- Yamon boot monitor supplied with source code
- Serial, Ethernet, hard drive and additional connectivity options
- Supplied with a TimeSys Linux hard drive with 10 hours of TimeSys support included
- Navigator ICS with MIPS System Navigator Probe available.

The Malta Development platform is a standard form factor base board with interchangeable daughters cards.

+ these daughter cards can contain a specific MIPS Core in a FPGA or, test chip when one is available.

+ the platform comes with a boot monitor based on Yamon which is also supplied as source code.

+ The platform along with Navigator ICS provides hardware and software support for Serial, Ethernet, a hard drive and PCI bus.

+ the platform comes with a bootable hard drive that contains version of a Linux distribution produced by TimeSys. The purchase of the platform includes 10 hours of support from TimeSys for this distribution.

+ The Malta system is fully supported by our Navigator ICS product.