Release Notes: GNUSH v10.03

6th October 2010

KPIT Cummins Infosystems Limited is releasing the GNUSH v10.03, a cross compiler tool for Renesas SH micro-controllers.

SALIENT FEATURES:

1. The GNUSH v10.03 toolchain is based on gcc-4.5.1 [released] binutils-2.20.51 [snapshot dated 2nd August 2010], newlib-1.18.0 [released] and gdb-7.1 [released].

2. The latest patches are applied to gcc, binutils and newlib sources.
   Please visit the following link for the patches applied to the GNUSH toolchain:
   http://www.kpitgnutools.com/phpmyfaq/index.php?aktion=artikel&rubrik=002004&id=78&lang=en

3. The -fstrict-volatile-bitfields compiler option is now set to default for the Renesas targets (RX, SH, H8 and M32C).

4. The optimized library now supports single precision versions of the math library functions such as 'atanf' and 'sqrtf'.

5. Support for 9 additional SH targets has been added in the KPIT GNU project generator.

6. The project wizards for GNUSH in HEW and Eclipse IDEs are modified to harmonize the naming of files, functions and data structures.

7. The GNUSH v10.03 ELF toolchain installer supports integration with KPIT Eclipse.
   Please visit the following link for information on the latest releases of KPIT Eclipse:
   http://www.kpitgnutools.com/releaseNotes.php

ABOUT GNUSH v10.03:

Release Version:	GNUSH v10.03
Release Date:	6th October 2010
Platforms Supported:	Red Hat GNU/Linux v8.0 or later (or compatible distribution) Windows NT / 2000 / XP / Vista / Windows 7
Language:	C, C99, C++
Targets:	SH-1 SH-2 SH-2A SH-2E SH2-DSP SH-3 SH-3E SH3-DSP SH-4 SH-4A SH-4AL-DSP
Object File Format:	ELF

CHANGES IN THIS RELEASE:

This section describes the enhancements made and the issues fixed in the v10.03 release.

GCC:

1. The -fstrict-volatile-bitfields compiler option has now been set to default for Renesas targets for functionality and maintaining consistency between Renesas RX, SH, H8 and M32C targets. This option ensures that the compiler generates the correct size (byte/word-level) access for volatile bit-fields while reading, writing or performing compare operations on volatile bit-fields.

2. Hand-optimized assembly code is implemented to replace GNU LIBGCC library, resulting in a considerable improvement of library performance in user applications.

3. The multiple register transfer instruction 'MOVML' has been implemented for the SH-2A target, resulting in optimized code for interrupt routines.

OPTLIB:

1. The optimized library now supports single precision versions of the math library functions such as 'atanf' and 'sqrtf'.

2. The 'log' function generated incorrect results for 64-bit big-endian targets. This bug has been fixed.

HEW (For Windows OS only):

1. Use of the Flash Development Tool (FDT) plug-ins under HEW is deprecated. Hence, users are advised to download the latest version of the FDT application and use it independently for Flash downloads.

2. **HEW 'ELF DWARF2' reader:**

   a. User was prompted to locate the source files on selecting download to target, due to incorrect DWARF source unit lookup. This bug has been fixed.

   b. The value of 'HardwareVectors[]' array elements could not be viewed in the watch window. This bug has been fixed.

3. **HEW 'Build Phase' DLL:**
   a. Inserting libraries via libraries tab used to crash HEW. This bug has now been fixed.

   b. User libraries were linked before user objects. The linking order has now been fixed.

   c. Options were not parsed / written correctly when the project type was LIBPROJECT. This bug has been fixed.

4. Support for 9 additional SH targets has been added in the KPIT GNU project generator. The newly added targets are listed below:
   SH2:   SH7137
   SH2A FPU: SH7254R, SH7262 and SH7216
   SH2A NoFPU: SH7243, SH7285 and SH7286
   SH4A: SH7730 and SH7763

HEW and KPIT Eclipse (For Windows OS only):

1. The project wizards for GNUSH in HEW and Eclipse IDEs are modified to harmonize the naming of files, functions and data structures. The new naming scheme for GNUSH project files in HEW and Eclipse is as follows:

GNUSH Toolchain	
Old Filename	**New Filename**
start.asm	reset_program.asm
vects.c	vector_table.c
hwinit.c	hardware_setup.c
inthandler.h	interrupt_handlers.h
inthandler.c	interrupt_handlers.c

KNOWN LIMITATIONS IN SH-ELF:

This section describes the known limitations in this release. We intend to fix these issues in our future releases. We occasionally release maintenance packs for critical bug fixes.

Windows and GNU/Linux:

1. In newlib, the 'fmod' function fails with and without "-mrenesas" option for the following single precision targets:
    a. SH2E
    b. SH2A-Single-Only
    c. SH3E
    d. SH4-Single-Only (little endian and big endian)
    e. SH4A-Single-Only (little endian and big endian)

2. The 'log10', 'ldexp' and 'frexp' functions of optimized libraries fail for SH4-Single-Only (little endian) and SH4A-Single-Only (little endian) targets.

3. Library Generator: Please visit the following link for the known issues and limitations related to this utility:
   http://www.kpitgnutools.com/phpmyfaq/index.php?aktion=artikel&rubrik=002003&id=415&lang=en

HEW (For Windows OS only):

1. The following features are currently not supported in HEW:
    a. 'Generate Makefile'
    b. Support for 'convrenesaslib' utility

2. For other limitations pertaining to the single interface for the compiler, assembler, linker and library generator, please visit the following link:
   http://www.kpitgnutools.com/phpmyfaq/index.php?aktion=artikel&rubrik=003001&id=445&lang=en

NOTE:
Windows and GNU/Linux:

1. The optimized libraries provided along with the newlib libraries in the toolchain do not require a separate download.

2. The optimized libraries ('liboptm.a' and 'liboptc.a') are not provided under GNU GPL. The source code of these optimized libraries is neither released nor available on request.

3. The "libgen" utility is not provided under GNU GPL. The source code of the "libgen" utility is neither released nor available on request.

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