SIEMENS EDA

MatchLib Connections **Release Notes**

Software Version v2.4.0
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SIEMENS

Table of Contents

Release 2.4.0

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release.

Enhancements

- N/A

Corrected Issues

- Updated NVHLS_ASSERT to use the AC_ASSERTION() macro instead of the C assert() macro
- Updated several toolkit examples to support the use of CcoverCheck
- Fixed the path to the cat_cdc script in toolkit 38_dot_product

Release 2.3.1

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release.

Enhancements

- N/A

Corrected Issues

- Removed some duplicate files and corrected #include syntax
- Improved the Scheduling Rules document
- Fixed bugs in JSON files for the examples 71_annotate_simple and 72_annotate_reconverge.

Release 2.2.3

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release.

Enhancements

- CAT-39436 - Add signal debug for custom types in simulation

Corrected Issues

- N/A

Release 2.2.2

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release.

Enhancements

- CAT-31753 - Add Wrapped and Marshaller specialization for arrays in marshaller.h

Corrected Issues

- CAT-39113 - Enforce Reset() is called for simulation in connections.h
- CAT-38997 - Add simulation support for In/Out/Combinational::PeekNB() in connections.h

Release 2.2.1

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release.

Enhancements

- CAT-38188 - Updates to support SystemC 3.0 and fixes in connections.h

Corrected Issues

- CAT-38139 - BitUnion2 compile error in marshaller.h
- CAT-38184 - Replace "_val" string check with macro _VLDNAMESTR_ in annotate.h
- CAT-38304 - Change directive #if to #ifdef __SYNTHESIS__ in connections_utils.h
- CAT-38136 - Fifo of size 1 does not achieve full throughput in connections_fifo.h

Release 2.2.0

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release.

The default port mode has changed from MARSHALL_PORT to DIRECT_PORT for simulation. This change will speed up pre-HLS simulation by eliminating the need to convert to/from sc_lv types.

The synthesis default has not changed from SYN_PORT which uses an underlying marshalled sc_lv type.

For simulation you can typically override the default with -
DAUTO_PORT=Connections::MARSHALL_PORT.

For synthesis you may want to override SYN_PORT with -
DFORCE_AUTO_PORT=Connections::DIRECT_PORT when using struct types.

NOTE: A port can be instantiated with an explicit port type if necessary, i.e.
Connections::In<my_type, Connections::DIRECT_PORT>.

Enhancements

- CAT-34924 - Update connections.h to use DIRECT_PORT by default for pre-HLS simulation
- CAT-37536 – Added Fifo_with_idle component

Corrected Issues

- CAT-37259 – Connections header is not compatible with SystemC 2.3.1
- CAT-36131 – Updated Catapult directives TCL scripts to use ‘solution design set’ instead of the DESIGN_HIERARCHY directive
- CAT-35944 – Clean up duplicated files
- CAT-31705 – Properly free dynamically allocated memory
- <no bug #> - updated set_vars.sh / set_vars.csh to point to local copy of BMP file utilities instead of downloading from the internet (the URL appears to be dead now)

Release 2.1.1

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release.

Note that this is the last release where the default connections port mode is “MARSHALL_PORT”. The next release will change the default from “MARSHALL_PORT” to “DIRECT_PORT”. As always, you can select the desired port mode in your design source using the -DFORCE_AUTO_PORT compiler directive.

Enhancements

- N/A

Corrected Issues

- CAT-31705 – free dynamically allocated memory
- CAT-35251 – applied missing ‘#pragma builtin modulario’ to DIRECT_PORT methods
- CAT-34936 – support for trace/log for DIRECT_PORT
- CAT-35587 – auto_gen_port_info.h: Incorrect array dimension order in wrapper rtl

Release 2.1.0

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release.

Enhancements

- Verilog wrapper generation around the pre-HLS SystemC DUT has been improved. The new auto_gen_port_info.h feature enables SystemC ports to be cleanly and easily specified in the pre-HLS SystemC model, and enables automatic generation of Verilog wrapper files. See Matchlib toolkit example 08_dma for further information.
- Added new example design 66_basic_round_robin_arbiter

Corrected Issues

- CAT-34421 – Catapult does not emit error message if signal missing from sensitivity list of SC_METHOD
- CAT-34872 – Corrected documentation for trace_hierarchy.
- CAT-34870 – connections_fifo.h error: 'setw' is not a member of 'std'
- CAT-35082 – Add include search path to ensure boost headers found

Release 1.6.0

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

Updated MatchLib contents to the mainline NVLabs/matchlib as of Aug 7, 2023.

Corrected Issues

N/A

Release 1.5.0

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

None

Corrected Issues

CAT-33347 – New “type mapping” feature requires fixed to connections_fifo.h

Release 1.3.0

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

Improved Platform Support

The MatchLib Connections and Matchlib Toolkit packages both rely on the original nVidia MatchLib package. As such they have dependencies on header files from the Linux platform – specifically some Boost headers. These headers are generally available on RedHat Linux installations but may be missing on other distributions. The MatchLib Toolkit package contains a shell script (set_vars.csh / set_vars.sh) that will download and install all package dependencies regardless of the platform. This script was enhanced in Release 1.3.0 to download Boost Static Assert which is required for some MatchLib headers.

Corrected Issues

CAT-30401 – Connections Fifo should support fast simulation. Added TLM_PORT specializations for the Fifo module that use a tlm::tlm_fifo container.

CAT-31235 – Fixes for tracing

CAT-31489 – Error with Connections Adder3 timing annotation example

Release 1.2.9

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

Improved error messages with new report_name() function.

The following new examples were added to the toolkits:

- 30_tlm2_dma
- 31_axi4_sigs_dma
- 32_dat_vld
- 70_python_matlab_integration
- 87_axi4_lite

Corrected Issues

CAT-30255 - Catapult 10.5c gets stuck in SCVerify using CONNECTIONS_FAST_SIM

CAT-30596 - Add workaround for using Xcelium with Connections

Release 1.2.8

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

Added a clean_all.sh script that runs the ‘clean’ target in all example directories.

Corrected Issues

CAT-29844 – Fix number of bits for long/unsigned long marshaller which changes based on 32/64-bit target arch

Release 1.2.7

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

Improved control of RAND_SEED - CAT-27370

The original distribution of MatchLib Connections from Nvidia (nvhls_rand.h) has the default seed value for random numbers to be the current time() value if the macro RAND_SEED is undefined. This caused non-determinism when rerunning the same design with random waits (CONN_RAND_STALL) multiple times. Now RAND_SEED will be set as a constant seed value if not defined prior to including connections_utils.h. If you want to use the default seed of time(), add #define USE_TIME_RAND_SEED.

Added support for a fifo in MatchLib Connections - CAT-28994

A new file connections/connections_fifo.h has been added which contains a Connections::Fifo module. The origin is a fork from Nvidia's nvhls_connections_buffered_ports.h (Buffer module).

The Connections default signal naming scheme (rdy/vld/dat) is used now.

Added CONNECTIONS_RESET_SIGNAL_IS(portname) to connections_utils.h

This is also a derivation of the original Nvidia source – extending it to allow control of the polarity of the reset signals. Now resets are fully programmable.

By default async_reset_signal_is(portname,false) is used.

Define CONNECTIONS_SYNC_RESET to use a sync reset.

Define CONNECTIONS_POS_RESET to use positive reset.

Created a Connections_event class – CAT-29067/CAT-29709

This extends the Connections library with an event class object similar to Connections_sync.

Corrected Issues

N/A

Release 1.2.6

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

Improved Reset Usage Error Checking - CAT-29244

If the ".Reset()", ".ResetRead()" or ".ResetWrite() methods are called on a non-leaf In or Out port, an error message (CONNECTIONS-102) is automatically issued since this is always an error.

Improved Clock Usage Error Checking - CAT-29244

If the user model uses an sc_clock object with Connections::In or Connections::Out ports and that clock is constructed with the posedge_first argument set to false, an error message (CONNECTIONS-303) is automatically issued since this is not currently supported by the Connections library.

Similarly, if the sc_clock object is constructed with a start_time that is not an integer multiple of the clock period, then an error message (CONNECTIONS-304) is automatically issued since this is not currently supported by the Connections library.

Improved Marshaller Error Checking - CAT-29221

If the user model attempts to implement the ".Marshall()" method for an object that is larger than 10,000 bytes then a static assertion is issued at compile time. This is intended to help avoid stack overflows during simulation because the marshalled objects are allocated on the stack in C++. Marshalled objects directly correspond to hardware ports so 10,000 is a reasonable upper limit for a single port width.

Corrected Issues

- CAT-29206: waveform tracing bug in connections.h

Release 1.2.4

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes. This version of *MatchLib Connections* was included in Catapult releases 10.6a.

Enhancements

Added support for VCS-MX compilation to the 45_vlog_tb_dma_dut example.

Moved the PDF documentation to the ‘pdfdocs’ folder.

Compilation of Connections now defaults to CONNECTIONS_ACCURATE_SIM.

CAT-27198 – Added support for ac_float to marshaller.h

CAT-26848 – Add waveform tracing for Matchlib SyncChannel

Corrected Issues

N/A

Release 1.2.3

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes. This version of *MatchLib Connections* was included in Catapult releases 10.6a.

Enhancements

N/A

Corrected Issues

N/A

Release 1.2.2

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes. This version of *MatchLib Connections* was included in Catapult releases 10.6.

Enhancements

Formatted with AStyle

Corrected Issues

N/A

Release 1.2.1

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

None

Corrected Issues

The following bugs were fixed:

- **(no bug #)**: Corrected p2p_checker to be sync_checker

Release 1.2.0

The following topics describes the changes that were made to the *MatchLib Connections* library since the last release. This release provides new functionality, enhancements and bug fixes.

Enhancements

This update to the Connections library contains significant enhancements to support multiple clocks and resets, as well as enhanced error checking. User models written using earlier version of the Connections library should work with this updated version without any modifications.

Multiple clocks are now supported.

Prior versions of the library only supported a single global clock, specified via the set_sim_clk() call. It is no longer necessary for user models to make this call, however if they do it is silently ignored.

Now, all clocks (sc_clock instances) are automatically discovered in the entire design.

For each SystemC process using Connections ports, the Connections library automatically determines the associated clock, sync reset, and async reset signals.

Dynamic resets are properly handled by the Connections library.

Error Reporting

Important errors are now automatically detected and reported by the connections library. The library checks:

- that every process sensitive to a clock consistently use the sync reset and async reset signals.
- that every process using Connections is reset at the start of simulation, and that every port or channel that such processes use have their Connections Reset methods called.
- that all message passing calls (Push, Pop, PushNB, PopNB) occur exactly at the time of the correct clock edge.

Channel Logging

The channel logging feature now supports both buffered and unbuffered output.

The channel_logs class enables logging information to be output from all Connections channel instances in a design.

There is a new optional argument to the channel_logs::enable(std::string file_name, bool unbuffered = false) call. For designs where simulation "hangs" or deadlocks, it is useful to set the unbuffered option to true. This will immediately flush all channel transactions to the output, making it easy to identify the last transactions in the system that occured immediately before the design deadlocked.

Marshaller Changes

Marshalling support added for ac_fixed, sc_fixed, ac_complex, ac_std_float, and ac::bfloat.

Connections Pin-level Signal Names

Connections pin level signal names were changed to be compatible with Catapult naming scheme rdy/vld/dat used with C++ designs. To continue using the original naming (rdy/val/msg), set the compiler flag -DCONNECTIONS_NAMING_ORIGINAL

Removed P2P Dependency

Removed dependency on Catapult's p2p_sync types for data-less Connections SyncIn/SyncOut ports and SyncChannel.

Random Stall

Add Connections input port methods to allow user override of randomization parameters when using CONN_RAND_STALL feature. Connections by defaults randomizes the Pacer stall and hold bounds. Use set_rand_stall_prob(float&) and set_rand_hold_stall_prob(float&) to override.

Corrected Issues

The following bugs were fixed:

- CAT-25216: Change Connections interface pins to match naming of ac_channel for the C++ flow.
- CAT-25338: Add connections support for ac_std_float and ac::bfloat
- CAT-25473: Sign bit needs to be handled properly in marshaller SpecialWrapper2
- CAT-25488: Merge MatchLib toolkit mc_connections.h, macros, tracing, and logging into Connections
- CAT-25772: Multiple clock and error message enhancements
- CAT-25773: Update Connections with new channel_logs class
- CAT-24885: MatchLib connections support for ac_fixed and sc_fixed
- CAT-24940: Support marshalling in ac_complex.h
- CAT-25256: Matchlib connection support for C datatypes
- CAT-25279: ac_channel bind() fails with more than three template parameters for ac_fixed

Supported Compilers

The MatchLib Connections package requires a C++ compiler that supports the C++11 or newer language standard.