

NetSpeed Crux

Release Notes

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NetSpeed Crux 16.09 Release Notes

About This Document

This document lists the release notes for NetSpeed Crux. Using NetSpeed NocStudio, users can define NoC architectures, describe specifications and requirements, optimize the NoC design and finally generate the NoC IP files such as RTL, testbench, synthesis scripts, NoC IP documentation etc.

Audience

This document is intended for users of NocStudio:

- NoC Designers
- NoC Architects
- SoC Architects

Prerequisite

Before proceeding, you should generally understand:

- Basics of NetSpeed Crux IP Technology

Related Documents

The following documents can be used as a reference to this document.

- NetSpeed NocStudio User Manual

Customer Support

For technical support about this product, please contact support@netspeedsystems.com

For general information about NetSpeed products refer to: www.netspeedsystems.com

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1 Deliverables

- NetSpeed NocStudio Package, N7 version supporting 16 layers and 256 bridges.
- NocStudio executable with interactive GUI.
- Verification checkers to be used in the DV environment.
- Sanity Test Bench.
- Documentation
 - a. NocStudio User Manual: The User Guide describes how to set up a system using NocStudio and how to use it to generate NetSpeed IP.
 - b. IP Integration Spec: The Integration Manual describes how to integrate a configured network into a larger subsystem.
 - c. Technical Reference Manual: The Technical Reference Manual describes how the functionality of the various NoC elements, the features and functions available, and how to dynamically change the functions using the programmer's mode.

2 Installation

- NocStudio uses FlexLM based licensing.
 - Copy over the license file emailed separately into a folder, and point LM_LICENSE_FILE environment variable to this license file before launching NocStudio.
 - NOTE: When untarring Linux files, ensure it is done on a Linux machine. Untarring Linux files on a Windows machine causes problems with symbolic links.
 - The executable requires Linux CentOS 5.5 or higher.
- The release makes use of Qt libraries covered under LGPL:
 - <http://qt-project.org/downloads>

3 Feature Updates

3.1 NoC CONSTRUCTION IMPROVEMENTS

3.1.1 Isolate and reduce congestion

NocStudio can now take special consideration while mapping high bandwidth traffic (based on the traffic rate or overall load on the transmitting and receiving interfaces) to isolate them from other traffic so as to reduce congestion in the NoC.

- The user can also sort traffic flows so as to map high bandwidth traffic flows first using the option “high_rate_traffic_flows” in the sort order argument to the map_opt command. NocStudio also automatically uses “high_rate_traffic_flows” as one of the many sort orders to sort traffic flows in each iteration of map_opt.
- The user can choose to make NocStudio avoid the mapping of high rate traffic flows and low rate traffic flows on the same VC as part of its mapping algorithm by using the “separate_high_rate_traffic_flows” argument in map_opt.

3.1.2 Automated FIFO sizing

Automatic sizing of FIFO depth on VC's with high bandwidth traffic during tune_links to prevent congestion in the NoC and head of line blocking.

3.1.3 Automated tune_links

tune_links is now run automatically at the end of map_opt to tune the link widths and FIFO depths. *tune_links* is also a separate command that a customer can choose to run.

3.2 GUI ENHANCEMENTS

3.2.1 Hide toolbars to increase screen real estate

Press Ctrl+H to hide/unhide the drawing toolbar and the top toolbar to increase the screen real estate.

3.2.2 Minimize the toolbars and the property panels to side tabs

The drawing toolbar, top toolbar and the property toolbar can be minimized to the sides to appear as tabs.

3.2.3 Hide inactive layers after mapping

The layers that don't have any traffic mapped on them are automatically hidden after mapping.

3.2.4 New way to add/remove link and port blockages in the Blockage View

In the blockage view, left click on a link to add/remove a link blockage (add/remove blockage to that link on all layers), and right click to add/remove a port blockage (add/remove blockage on the link only on the clicked layer).

3.2.5 Collapse all the buttons to add the different bridges to single 'Add' button

The add buttons of different bridges are all collapsed into one 'Add' button.

3.2.6 Errored commands remain on console for editing

An errored command remains on the console so that the user can edit it rather than having to retype the entire command.

3.2.7 Change color of link when clicked

When a link is clicked, its color changes to pink so that the user knows which link he is currently viewing the state/properties of.

3.3 MULTI-NOC

RTL from multiple NoCs can now be integrated into the same design for simulation. Each NoC must have a unique mesh name and the following NocStudio property setting:

```
prop_default tag_project_name yes
```

Two or more NoCs can be integrated with no upper limit to the number of NoCs. Only one coherent NoC is supported per set of NoCs. Crux NoCs cannot be mixed with Orion/Gemini NoCs.

3.4 SYNCHRONIZER DEPTH AND FIFO SIZING

NocStudio now supports programmable synchronizer depths, both for general synchronizers (ns_demet.v) and for reset synchronizers (ns_rst_n.v). Users may select synchronizer depths, based on their own library/process requirements, on a per-clock-domain granularity.

3.5 MULTI-CELL-SIZE NOCS

Cell size can be a system-wide constant indicating a common denominator for data sizes.

Upsizing and downsizing of data happens on power-of-2 multiples of the cell size. For a system with more than one cell size, where interface data width is specified in terms of one of the cell sizes, and communication only happens between interfaces that share a cell size, the cell size property can be set to -1 to indicate that NocStudio should allow multiple cell sizes. Each

physical network (a.k.a. layer) can only support one cell size. NocStudio has been enhanced to support multiple cell sizes within a system.

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4 EDA Tool Compatibility

- Cadence EDA tools were used for verification and synthesis of this product.
- Compatibility testing has been done with VCS. Issues, if any, might be seen in the verification IP for specific configurations. The NetSpeed IP Integration specification lists the various defines to be used to enable / disable Verification IP. NetSpeed support will be available to resolve any issues.

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5 Errata

5.1 SYNTHESIS RESULTS WITH MULTI CELL SIZE NOCs

It has been observed that the synthesis tools do not propagate constants defined in the RTL code properly for some configuration with multi cell_size option. This results in dividers being instantiated in the netlist and reducing the achievable frequency. Please contact NetSpeed Support team if your design intends to implement multi cell size NoC.

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6 Changes to Commands and Properties

6.1 COMMAND CHANGES

Command Name	Comment
add_output_reg_across_rtl_group	Name change. Previous name was add_output_reg_across_rtlgroup
show_project	New command to print the project name
map	This command has been deprecated
tune_route	This command has been deprecated
tune_links	This command has been deprecated

6.2 DEFAULT PROPERTY CHANGES

Property Name	Default Value	Comment
msg_peak_bw	6.4	This property has been deprecated
msg_peak_rate	0.1	This property has been deprecated
peak_multiplier	1	New property to specify the default multiplier to calculate peak rate/bw from average rate/bw when the peak rate/bw is not specified
read_burstiness	1	The default value for this property has been changed from 3 to 1

6.3 MESH PROPERTY CHANGES

Property Name	Default Value	Comment
compact_regbus_address_space	Yes	Default value of this property has changed from No to Yes
extra_bandwidth_provisioning	0	Default value of this property has changed from 25 to 0

stats_level	High	New property to specify the default level of statistics collection in NocStudio performance simulator
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6.4 BRIDGE PROPERTY CHANGES

None

6.5 HOST PROPERTY CHANGES

None

6.6 INTERFACE PROPERTY CHANGES

Property Name	Comment
initial_credits	This property has been deprecated.

6.7 LINK PROPERTY CHANGES

None

6.8 ROUTER PROPERTY CHANGES

None

6.9 VC PROPERTY CHANGES

None

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