NetSpeed Crux

Release Notes

Version: CRUX-16.12

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NetSpeed Crux 16.12 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

Contents

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: System Interconnect

3.1 PER NODE CLOCK DELAY

With today's scalable SoCs comes the challenge of physical design especially in routing and managing the clock skews across the floorplan. Balancing the clocks across a chip is not an easy task and NocStudio eases this burden by providing the ability for system architects and physical designers to assign a clock delay at each node, to adjust pipeline depths for links between different nodes. The relative difference in clock delay is used to adjust propagation delay, allowing unbalanced clock trees to be handled without clock crossers. The feature also helps in reducing the physical design iteration by allowing a way to import some of the clocking characteristics back into NocStudio and providing an RTL that is already tailored to meet those specifications.

3.1.1 GUI Enhancement

In the clock domain view, the clock delays of each node are displayed in the bottom left corner of each node. The clock delay of a node can be changed by clicking on the clock delay and entering the new value in the text box that appears. There is a check box in the top left corner of the clock domain view that allows toggling between showing and hiding the clock delays of the nodes. The value of the clock delay can also be changed from the console through the command *set_node_clock_delay*.

3.2 CONTROL OF WARNING MESSAGES

Depending on the development phase or the debug requirement users need control over the generation of warning messages, to focus on other part of the design. NocStudio has added two commands for user to choose the level at which warning message can be hidden and ignored. The *hide_warning* allows fine-grained control over whether various warning messages are printed, while the *set_debug_level* allows 'all warnings and info messages' or 'all info messages' to be not printed.

3.3 USER DEFINED COMMAND

NocStudio adds support for user define commands by allowing creation of values that can be used later, either

- as tokens in an existing command or
- as an entire command or
- sequence of commands.

This is similar to a #define to help user create commands specific to their system requirements and reusing them. Please refer of the User Manual or the NocStudio Help for details description of these commands.

3.4 DOMAIN CROSSER

It is now possible to skip the routers which have async ports, and instead have Domain Crossers be present across the async link. This is done through the prop_default *keep_routers_for_async*, which is set to "yes" by default, meaning that async routers are not skipped. When this prop is turned "no", the async routers are skipped and instead, there are Domain Crossers added on the async links.

3.5 ROUTER ARBITRATION

Within a QoS weighting round, the round-robin arbitration switches between the different ports. This distributes bandwidth within the round, and reduces the worst-case latency for a request, since it doesn't have to wait for all of the requests to be issued from the prior ports. Disabling the round-robin arbitration has the advantage that the arbitration within the QoS round will have a static prioritization, which will tend to keep accesses from the same agent selected together. This can increase memory controller efficiency by keeping accesses to the same DRAM page clustered together in the network so that they arrive together at the memory controller. Disabling round - robin will result in some agents taking longer to get their requests to memory. If QoS weighting is disabled in the NoC, the round-robin arbitration should not be disabled or starvation can occur for some agents. The QoS weighting takes effect regardless of whether the round - robin arbitration is enabled, so disabling it will not affect overall bandwidth allocation. It only affects the order of requests within a QoS round.

4 Feature Updates: Streaming Protocol

NTR

5 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.

6   Errata: System Interconnect

NTR

7 Errata: Streaming Protocol

7.1 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.

8   Changes to Commands and Properties

8.1   COMMAND CHANGES

Command Name	Comment
defcmd	New command to define a new NocStudio command based on existing commands.
define	New command to define a constant that can be referred to in later commands.
set_node_clock_delay	New command to set the clock delay for each node in the mesh.
list_node_clock_delay	New command to list the clock delay for all nodes in the mesh.
assign_regbus_node_clock_domain	New command to set the clock domain that will be used by regbus elements.
reset_regbus_node_clock_domain	New command to reset the clock domain settings of all regbus elements.
set_debug_level	New command to change the level of messages that are printed.
show_noc_density	New command to print a report of the wire and flop counts.
reset_prop_defaults	New command to reset the values of default properties to their original value.
set_traffic_props	New command to modify the class, layers or VC's of existing traffic.
set_ifce_noc_layer	New command to set the NoC layer that traffic from each NSIP interface is mapped on.
add_multicast_group	New command to add a group of multicast destinations.
del_multicast_group	New command to delete a group of multicast destinations.
list_multicast_groups	New command to list the groups of multicast destinations.
set_route_type	This command now accepts source and destination interfaces as arguments instead of source and destination bridges.

8.2 DEFAULT PROPERTY CHANGES

Property Name	Default Value	Comment
cell_size	9	This property has been deprecated.
gen_dep_graph	no	New default property to enable to generation of all_dependency_graph.gv.
keep_routers_for_async	yes	New default property that can be set to no to enable the use of in-link domain crossers instead of routers for clock crossing.
between_underscore_token	<none>	New default property to inject a string between double-underscores used for RTL.
enable_round_robin	yes	New default property to enable or disable round robin arbitration between different ports of a bridge or router.
gen_all_ifce_deps	no	New default property to enable the writing of a file that contains all interface level dependencies after mapping.

8.3 MESH PROPERTY CHANGES

None

8.4 BRIDGE PROPERTY CHANGES

Property Name	Comment
enable_round_robin	New bridge property to enable or disable round robin arbitration between different ports of the bridge.

8.5 HOST PROPERTY CHANGES

None

8.6 INTERFACE PROPERTY CHANGES

None

8.7 LINK PROPERTY CHANGES

None

8.8 ROUTER PROPERTY CHANGES

Property Name	Comment
enable_round_robin	New property that enables round robin arbitration between different ports of the router.

8.9 VC PROPERTY CHANGES

None

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