Verification Continuum™

VC Verification IP
AMBA
Release Notes

Version S-2021.06, June 2021

SYNOPSYS®

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Release Notes: VC Verification IP for AMBA

1.1 Introduction

The AMBA® VIP supports verification of SoC designs that include interfaces implementing the AMBA Specification.

The AMBA VIP supports the following methodologies:

- UVM
- OVM
- VMM

The AMBA VIP supports following protocols:

- AXI3
- AXI4/AXI4-Lite
- ACE/ACE-Lite
- AXI4 Stream
- AHB5/AHB3-Lite /AHB2
- APB2
- APB3
- APB4
- ATB
- CHI
- ACE5 (Early Adopter)

The changes for version S-2021.06 of AMBA VIP are described here.

Note Based on the AMBA Progressive Terminology updates, you must interpret the term Master as Manager and Slave as Subordinate in the VIP documentation and messages.

Note

- Smartsearch integration of HTML version of AMBA Release Notes is supported only for the following HTML class reference documentation:
  - amba_svt_uvm_class_reference
  - amba_svt_ovm_class_reference

  However, these class reference documentation will not have Smartsearch integration of the HTML versions of AMBA SVT UVM User Guide and AMBA SVT OVM User Guide respectively.
- Smartsearch integration of the HTML version of CHI UVM User Guide, HTML version of CHI UVM Getting Started Guide is supported only for the following CHI class reference documentation:
  - chi_svt_uvm_class_reference

Attention

This VIP has been included and integrated with the Verification Compiler Platform product and as of the VC VIP Library J-2014.06-SP1 release has been renamed VC VIP AMBA to highlight that integration. The change is solely to the name and does not affect any features of the VIP, licensing, simulator support, functionality or methodology support. The VIP continues to be available as a stand-alone title and as part of the VC VIP Library.

Note

IEEE Encryption is not supported in this version.

1.2 Downloading Installation Run Files

Attention

The Electronic Software Transfer (EST) system only displays products your site is entitled to download. If the product you are looking for is not visible, contact est-ext@synopsys.com.

Follow the instructions below for downloading the software from Synopsys. You can download from the Download Center using either HTTPS or FTP, or with a command-line FTP session. If your Synopsys SolvNet password is unknown or forgotten, go to http://solvnetplus.synopsys.com.

Passive mode FTP is required. The passive command toggles between passive and active mode. If your FTP utility does not support passive mode, use http. For additional information, refer to the following web page:

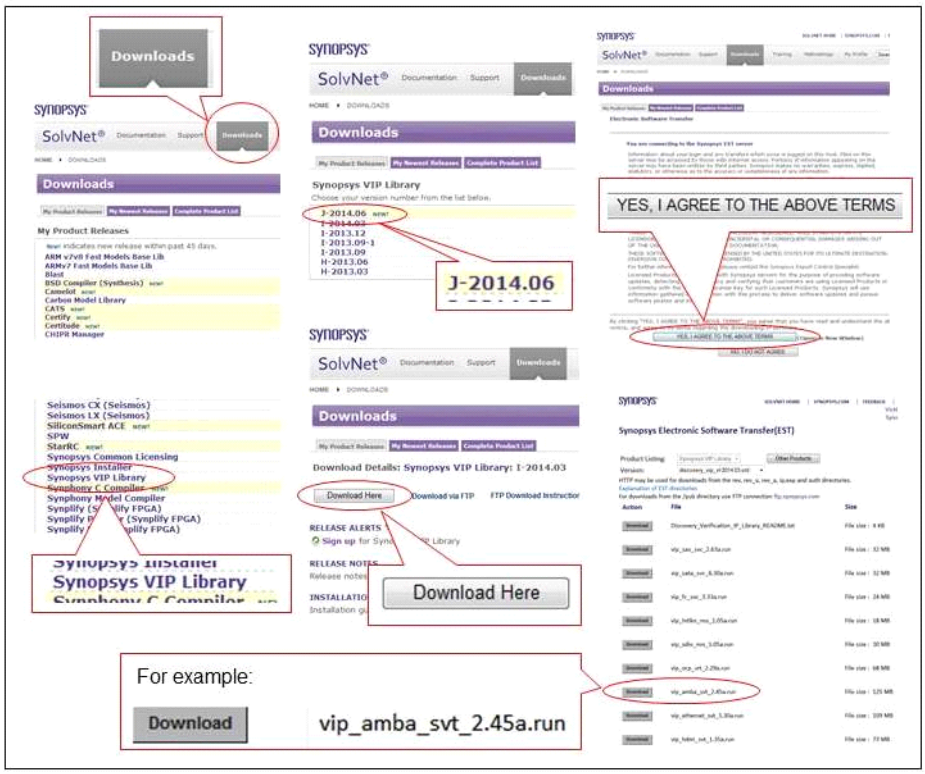
https://www.synopsys.com/apps/protected/support/EST-FTP_Accelerator_Help_Page.html

1.2.1 Downloading From the Electronic Software Transfer (EST) System (Download Center)

1. Point your web browser to https://solvnetplus.synopsys.com.
2. Enter your Synopsys SolvNetPlus Username and Password.
3. Click Sign In button.
4. Make the following selections on SolvNet to download the `.run` file of the VIP (See Figure 1-1).
   a. Downloads tab
   b. VC VIP Library product releases

c. <release_version>
d. Download Here button
e. Yes, I Agree to the Above Terms button
f. Download `.run` file for the VIP

Figure 1-1 SolvNet Selections for VIP Download



a. Set the `DESIGNWARE_HOME` environment variable to a path where you want to install the VIP.

```
% setenv DESIGNWARE_HOME VIP_installation_path
```

b. Execute the `.run` file by invoking its filename. The VIP is unpacked and all files and directories are installed under the path specified by the `DESIGNWARE_HOME` environment variable. The `.run` file can be executed from any directory. The important step is to set the `DESIGNWARE_HOME` environment variable before executing the `.run` file.

Note The Synopsys AMBA VIP suite includes VIP models for all AMBA interfaces (AHB, APB, AXI, and ATB). You must download the VC VIP for AMBA suite to access the VIP models for AHB, APB, AXI, and ATB.

1.3 SolvNet SVT VIP Articles

Informative technical articles about AMBA_SVT reside on the SolvNet website, which provides custom search features including full-text search for both HTML and PDF files.

To search for articles, go to the following URL:

http://solvnetplus.synopsys.com

To help your search, choose the category “VC Verification IP”.

1.4 Customer Support

To obtain support for your product, choose one of the following:

1. Go to https://solvnetplus.synopsys.com and open a case.

   Enter the information according to your environment and your issue.

2. Send an e-mail message to support_center@synopsys.com.

   Include the Product name, Sub Product name, and Tool Version in your e-mail so it can be routed correctly.

3. Telephone your local support center.

   - North America:

     Call 1-800-245-8005 from 7 AM to 5:30 PM Pacific time, Monday through Friday.

   - All other countries:

     https://www.synopsys.com/support/global-support-centers.html

1.5 Verdi Protocol Analyzer Version

AMBA SVT VIP supports the R-2020.12 version of Verdi Protocol Analyzer.

1.6 Licensing Information

Licensing is required if the VIP component classes are instantiated in the design. This includes envs, agents, drivers, monitors, sequencers, and components in UVM and OVM. This includes groups, subenvs, and transactors in VMM.

Note For Early Adopter (EA) features, LIBRARY2019 license will only work with -EA keys. -BETA keys are not supported with 'LIBRARY2019 license'.

AMBA licensing is updated from P-2019.03 Release.

The order in which licenses are checked out is as described in this table. The table below summarizes the license requirements for different AMBA interfaces.

Table 1-1 License Requirements for AMBA Interfaces

VIP Interface	License Checkout Order	Product Availability
ATB	VIP-AMBA-ATB-SVT -OR- VIP-AMBA-SVT -OR- VIP-PROTOCOL-SVT -OR- VIP-SOC-LIBRARY-SVT -OR- VIP-LIBRARY-SVT + DesignWare-Regression -OR- VIP-LIBRARY2019-SVT	General Availability
APB4/APB3/APB2	VIP-AMBA-APB-SVT -OR- VIP-AMBA-SVT -OR- VIP-PROTOCOL-SVT -OR- VIP-SOC-LIBRARY-SVT -OR- VIP-LIBRARY-SVT + DesignWare-Regression -OR- VIP-LIBRARY2019-SVT	General Availability
AHB3/ AHB2/ AHB-Lite/ AHB Multi-Layer	VIP-AMBA-AHB-SVT -OR- VIP-AMBA-AHB5-SVT -OR- VIP-AMBA-SVT -OR- VIP-PROTOCOL-SVT -OR- VIP-SOC-LIBRARY-SVT -OR- VIP-LIBRARY-SVT + DesignWare-Regression -OR- VIP-LIBRARY2019-SVT	General Availability
AHB5	VIP-AMBA-AHB5-SVT -OR- VIP-LIBRARY-SVT + DesignWare-Regression -OR- VIP-LIBRARY2019-SVT	General Availability

Table 1-1 License Requirements for AMBA Interfaces

VIP Interface	License Checkout Order	Product Availability
AXI4 STREAM	VIP-AMBA-STREAM-SVT -OR- VIP-AMBA-DTI-SVT -OR- VIP-AMBA-SVT -OR- VIP-PROTOCOL-SVT -OR- VIP-SOC-LIBRARY-SVT -OR- VIP-LIBRARY-SVT + DesignWare-Regression -OR- VIP-LIBRARY2019-SVT	General Availability
AXI4/AXI4-Lite/AXI3	VIP-AMBA-AXI-SVT -OR- VIP-AMBA-ACE-SVT -OR- VIP-AMBA-ACE5-SVT -OR- VIP-AMBA-SVT -OR- VIP-PROTOCOL-SVT -OR- VIP-SOC-LIBRARY-SVT -OR- VIP-LIBRARY-SVT + DesignWare-Regression -OR- VIP-LIBRARY2019-SVT	General Availability
ACE/ACE-Lite	VIP-AMBA-ACE-SVT -OR- VIP-AMBA-ACE5-SVT -OR- VIP-AMBA-SVT -OR- VIP-PROTOCOL-SVT -OR- VIP-SOC-LIBRARY-SVT -OR- VIP-LIBRARY-SVT + DesignWare-Regression -OR- VIP-LIBRARY2019-SVT	General Availability

Table 1-1 License Requirements for AMBA Interfaces

VIP Interface	License Checkout Order	Product Availability
ACE5/ACE5-Lite/AXI5	VIP-AMBA-ACE5-SVT VIP-LIBRARY2019-SVT	General Availability
AXI5/AXI5-Lite	VIP-AMBA-AXI5-SVT VIP-LIBRARY2019-SVT	General Availability
CHI-A/CHI-B/CHI-C/CHI-D/CHI-E	VIP-AMBA-CHI-SVT VIP-LIBRARY-SVT + DesignWare-Regression VIP-LIBRARY2019-SVT	General Availability
DTI	VIP-AMBA-DTI-SVT -OR- VIP-AMBA-DTI-EA-SVT+VIP-LIBRARY2019-SVT	Early Adopter

2 AMBA System Environment Details

The following are the AMBA system environment details:

- AMBA System Env UVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/amba_svt_uvm_user_guide.pdf`
- AMBA System Env UVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/amba_svt_uvm_class_reference/html/index.html`

2.1 Notes for Release S-2021.06

- Updated the VIP version as S-2021.06.

2.1.1 Enhancements/E-STARs

E-STAR	Description
None	-

2.1.2 Bug Fixes/B-STARs

B-STAR	Description
None	-

2.2 Notes for Previous Releases

2.2.1 Notes for Release R-2021.03-2

- Updated the VIP version as R-2021.03-2.

2.2.1.1 Enhancements/E-STARs

E-STAR	Description
3590680	MCSM: support CleanSharedPersist, CleanSharedPersistSep from RN-F to HN-I

2.2.1.2 Bug Fixes/B-STARs

B-STAR	Description
3370432	amba system monitor cannot handle unaligned apb transfers

2.2.2 Notes for Release R-2021.03-1

- Updated the VIP version as R-2021.03-1.

2.2.2.1 Enhancements/E-STARs

E-STAR	Description
3560779	add full hierarchy path in the name of rn_cache

2.2.2.2 Bug Fixes/B-STARs

B-STAR	Description
3455396	NOA Error from svt_axi_port_configuration::do_is_valid()
3439923	VCATB: port_id not set correctly in the axi system configuration

2.2.3 Notes for Release R-2021.03

- Updated the VIP version as R-2021.03.

2.2.3.1 Enhancements/E-STARs

E-STAR	Description
None	-

2.2.3.2 Bug Fixes/B-STARs

B-STAR	Description
None	-

2.2.4 Notes for Release R-2020.12-3

- Updated the VIP version as R-2020.12-3.

2.2.4.1 Enhancements/E-STARs

E-STAR	Description
None	-

2.2.4.2 Bug Fixes/B-STARs

B-STAR	Description
None	-

2.2.5 Notes for Release R-2020.12

- Updated the VIP version as R-2020.12.

2.2.5.1 Enhancements/E-STARs

E-STAR	Description
None	-

2.2.5.2 Bug Fixes/B-STARs

B-STAR	Description
None	-

2.2.6 Notes for Release R-2020.09-3

- Updated the VIP version as R-2020.09-3.

2.2.6.1 Enhancements/E-STARs

E-STAR	Description
3437327	Add system ID info to DVM check error messages
3442661	MCSM: incorrect slave idx info in the slave_transaction_routing_check error msg

2.2.6.2 Bug Fixes/B-STARs

B-STAR	Description
None	-

2.2.7 Notes for Release R-2020.09-2

- Updated the VIP version as R-2020.09-2.

2.2.7.1 Enhancements/E-STARs

E-STAR	Description
3357140	MCSM: support the scenario "SNPSHARED generated for a WRITECLEANFULL"

2.2.7.2 Bug Fixes/B-STARs

B-STAR	Description
3389600	AMBA MCSM: Issues in the get_snoop_route_ports method
3398651	MCSM: typo in error message

3 AXI Verification IP Notes

These release notes describe the changes for S-2021.06 version of the VC Verification IP for AMBA AXI.

3.1 Introduction

The AXI VIP supports verification of SoC designs that include interfaces implementing the AXI Specification.

The AXI Verification IP supports the following methodologies:

- UVM
- VMM
- OVM

The AXI VIP supports following protocols:

- AXI3
- AXI5/AXI4/AXI4-Lite
- ACE5/ACE/ACE-Lite
- AXI4 Stream

3.2 Supported Methodology, OS, and Simulator Versions

This version of AXI VIP is qualified with version R-2020.12 of SystemVerilog Verification Technology (SVT). SVT is an internal portion of the VIP and provides base VIP functionality, some utilities, and support for installation and licensing.

This version supports SVT R-2020.12 and later. The version of SVT is the key for determining which versions of platform/OS and simulators have been qualified with this VIP. Whenever a new version of SVT is released, this VIP is qualified with it.

To determine the version of SVT in an existing DESIGNWARE_HOME installation, use:

```
$DESIGNWARE_HOME/bin/dw_vip_setup -i home
```

Xcelium Simulator 19.09.004 is not supported in AMBA VIP release Q-2020.03.

Note To avoid ICDPAV (Illegal Combination of Driver and Procedural Assignment to Variable) error/warning from IUS simulator, use the Bind interface provided with the VIP. Refer to tb_axi_svt_uvm_intermediate_sys example for usage of bind interface.

This table lists the supported methodology versions.

Table 3-2 Supported Methodology Versions

Methodology	Supported Version	Unsupported Version
OVM	2.1.2	2.1.1_3
UVM	1.1d, 1.2, 1800.2-2017-1.0,1800.2-2017-1.1	1.1a
VMM	1.1, 1.2	NA

3.2.1 Supported Simulator Platforms

The simulator matrix table is available at the following location:

VC VIP Library page
https://spdocs.synopsys.com/dow_retrieve/latest/vg/snps_vip_lib/PDFs/simulator_matrix.pdf

For more information on the simulator matrix and library level updates, see VC VIP Library Release Notes.

Table 3-1 shows the list of methodologies supported with the simulators.

Table 3-3 Supported Methodologies with Simulators

Methodology	VCS	Xcelium	Questasim
UVM 1.1d, 1.2	Supported	Supported	Supported
UVM 1800.2-2017-1.0, 1800.2-2017-1.1	Supported	Supported	Not yet supported
OVM	Supported	Not yet supported	Supported
VMM	Supported	N/A	N/A
VLOG	Supported	Supported (multi-step flow supported, irun flow not yet supported)	Not yet supported

3.3 Known Issues and Limitations

- The basic UVM example `tb_axi_svt_uvm_basic_program_sys` is supported only on the VCS simulator.
- `Test ace_multipart_dvm_test` in example `tb_axi_svt_uvm_ace_sys` is expected to fail on IUS and MTI simulators.
- The tests in example `tb_axi_svt_uvm_intermediate_sys` and `tb_axi_svt_uvm_axi4stream_sys` are not supported on IUS simulator.
- Verilog command basic example `tb_axi_svt_verilog_basic_sys` is not supported with IUS irun flow. It is only supported with IUS multi-step flow.

- When AXI UVM examples are run on MTI, warnings related to coverage are issued. These are not seen on VCS and IUS simulators.
- Interconnect and System Monitor components are not yet supported in Verilog command flow.
- ACE feature is not yet supported in Verilog command flow.
- READONCE and WRITEUNIQUE transactions that span multiple cachelines are supported only for ACE-LITE interface.
- Interconnect component does not support AXI3 Locked access.
- Delays within the transaction and between two transactions are not supported in AXI4 Stream.
- The value 1 for default_tready is not supported in AXI4 Stream.
- Optional signaling is not supported in AXI4 Stream, that is, all signals are driven and sampled by default.
- Ability to provide the slave response object to slave driver, after a delay of greater than 0 clock cycles, through an additional TLM port, is not yet supported in VMM and Verilog Command flows. However, this feature is currently supported only in UVM and OVM flows.
- Compilation failure may occur for the following combination of methodology, simulator and platform:

  UVM, IUS (irun flow), Suse 10.0/11.0.

  If you observe a compilation failure with this combination, add `-gcc_vers` 4.1 to the irun command line.
- Performance Analysis feature is not yet supported on VMM and Verilog command flows. It is supported only on UVM and OVM flow currently.
- AXI VIP does not support the feature of disabling output signals and assuming default values on missing input signals, as specified by chapter Default Signaling and Interoperability in AXI4 specification.
- TLM Generic Payload feature does not yet map TLM Generic Payload transactions to AXI transactions with burst length greater than 16. This feature is currently supported on UVM flow only.
- AMBA VIP does not support MTI 10.3 version.
- Class reference HTML has a known issue in release J-2014.12-SP2-1. The argument names of public methods are not displayed correctly. The argument names appear as the method name.
- Dynamic reset for AXI4 Stream is not supported for OVM and VMM flow.
- Axi4 stream (OVM/UVM) is not supported with IUS and MTI.
- `tb_axi_svt_uvm_intermediate_ral_sys` and `tb_axi_svt_uvm_basic_active_passive_sys` are not supported for IUS simulator.
- AXI Interconnect VIP component does not support ACE-5 features.
- ACE5 Poison and Data Check features supported only for ACE-Lite. These are not yet supported by AXI/ACE system monitor.
- These examples are not supported on IUS simulator:
  - `tb_axi_svt_uvm_basic_active_passive_sys`
  - `tb_axi_svt_uvm_intermediate_ral_sys`

- VCS switch +lint=LRM_1800_2009 causes compilation errors.
- IEEE Encryption and Incdir flow is supported in VCS and MTI simulators only. For more details, see the sections 2.6 and 2.7 in the VC VIP Library Installation Guide.
- Refer to ACE5 section in AXI User Guide for list of unsupported features in ACE5.
- Dynamic reset not supported for AXI System monitor.
- All the AXI5/ACE5/ACE5-Lite* features supported by AXI SVT VIP are supported only with UVM methodology. These features are not supported with OVM and VMM methodologies.
- `data_valid_assertion_time` and `data_ready_assertion_time` values are showing all 0 in PA for AXI3 and AXI4_stream.
- No beat level info separation. The whole array is shown in PA for AXI3, AXI4_stream.
- Euclide lint check is not supported with IEEE 1800.2 UVM.
- AXI/ACE VIP is supported with VCS versions 2020.12-SP1 or later.
- AXI/ACE is compatible with UVM Version 1.1d.

3.4 Documentation

After the VIP is downloaded and installed, product documentation resides at:

```
$DESIGNWARE_HOME/vip/AMBA SVT/latest/doc/
```

The documentation consists of the following:

- AXI UVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/axi_svt_uvm_user_guide.pdf`
- AXI UVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/axi_svt_uvm_class_reference/html/index.html`
- AXI UVM Basic example Quickstart is located at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/examples/sverilog/tb_axi_svt_uvm_basic_sys/doc/tb_axi_svt_uvm_basic_sys/index_basic.html`
- AMBA System Env OVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/amba_svt_ovm_user_guide.pdf`
- AMBA System Env OVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/amba_svt_ovm_class_reference/html/index.html`
- AXI OVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/axi_svt_ovm_user_guide.pdf`
- AXI OVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/axi_svt_ovm_class_reference/html/index.html`
- AXI OVM Basic example Quickstart is located at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/examples/sverilog/tb_axi_svt_ovm_basic_sys/doc/tb_axi_svt_ovm_basic_sys/index_basic.html`
- AXI VMM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/axi_svt_vmm_user_guide.pdf`

- AXI VMM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/axi_svt_vmm_class_reference/html/index.html`
- Verification Plans: Pointer to directory with README and *.xml files:

  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/VerificationPlans/README`
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/VerificationPlans/*.xml`

Note For Test Suite, contact Synopsys.

Attention Beginning in December 2014 with the J-2014.12 release, Synopsys Verification IP products adopt the release version format recommended by the company. The new version format is:

<alphabet>-<year>.<month>

<alphabet> is a single letter corresponding to the QSC foundation that the release is compliant with.
<year> is a 4-digit number corresponding to the year of the release.
<month> is a 2-digit number corresponding to the month of the release.

For patch releases, a "-<patch_number>" is appended to the release version.
For Service Pack releases, a "-SP<number>" is appended to the release version.

For example:

J-2014.12	Release in December 2014 that is compliant with the J foundation
J-2014.12-1	First patch on the J-2014.12 release
J-2014.12-SP1	First Service Pack release for J-2014.12

Note Version 2.93a was the last release before the version change.

3.5 Notes for Release S-2021.06

- Updated the VIP version as S-2021.06.
- VIP is compatible with VCS +lint= LRM_1800_2009 option.

3.5.1 Enhancements/E-STARs

E-STAR	Description
None	-

3.5.2 Bug Fixes/B-STARs

E-STAR	Description
3665107	signal_valid_arvalid_check error is not reported even though arvalid is X

3.6 Notes for Previous Releases

3.6.1 Notes for Release R-2021.03-2

- Updated the VIP version as R-2021.03-2.
- Added support for the following features in AXI5 UVM master and slave agents:
  - MPAM

3.6.1.1 Enhancements/E-STARs

E-STAR	Description
3669388	pack_data_to_byte_stream related error message needs to provide more debug info
3645328	SVT AXI: Need read data interleaving check support in active master, when slave does not support read data interleaving
3470235	Support Protocol Analyzer with AXI4 STREAM VIP
3660901	tready_delay.size() should be 1 in active slave transaction when tlast is disabled
3633494	ACE5 ATOMIC WRITE data related properties documentation updates
3609233	Performance Improvement - AXI VIP Updates for xidunq and cfg.single_outstanding_per_id_enable then active xact ID collection logic needs update
3574194	master_slave_xact_data_integrity_check failure for speculative reads
3651658	‘exokay_resp_observed_only_for_exclusive_transactions_check’ never fails on VIP master monitor when an EX-OKAY response is seen from the Slave agent for a non exclusive master transaction
3514322	[ACE5] Support for feature "Coherency connection signaling"
3632987	SVT AXI4: Add transaction level control variable to disable auto generation of ecc code signals by VIP

3.6.1.2 Bug Fixes/B-STARs

B-STAR	Description
3626849	Axsize toggle coverage is incorrectly shaped
3598709	trans_cross_ace_awsnoop_awlen: coverbins for burst_length>16 are incorrectly marked as ignore_bins
3605211	AXI system level coverage compile issue when the macro `SVT_AXI_EXCLUDE_AXI_SYSTEM_COVERAGE is defined
3649485	AXI4 stream slave transaction object does not have tvalid_delay attribute
3649475	tvalid_delay and tready_delay are not populated in transaction object in passive components
3263805	Data getting truncated when generating trace files in AXI
3544387	issue in capturing the arready by axi passive slave vip
3441976	AXI outstanding generation error

3.6.2 Notes for Release R-2021.03-1

- Updated the VIP version as R-2021.03-1.
- Added support for the following features in AXI5 UVM master and slave agents:
  - User Loopback Signaling.

3.6.2.1 Enhancements/E-STARs

E-STAR	Description
3428407	"Stack Overflow" Error occurred with IEEE UVM when uvm recording is turned on
3466961	Atomic Load- Error from active master - Current xact has violated read interleave depth restrictions
3604937	AXI4 VIP runtime slow down with custom FuSa features enabled
3604932	AXI4 VIP custom FuSa feature - Code Bits Generation for mismatched signal width
3612038	AXI-G: multiple same ID address driven when xact.is_idunq is asserted
3611506	expected read data chunk incorrect in master driver
3611500	support for arlen=1 when data_size is not equal to burst_size
3611197	Provide different combinations of rchunkstrb and rchunknum through post_randomize. Currently walking 1 pattern for rchunkstrb provided
3611195	rchunkstrb does not take the address offset in consideration
3611178	Need control on slave VIP side to control RCHUNKV signal on a per transaction basis. User should be able to de-assert RCHUNKV even when master asserts ARCHUNKEN
3611175	Check firing that ARCHUNKEN asserted but ARIDUNIQ not asserted => Change from Error to Warning
3611173	Support for automated generation of rchunkstrb and rchunknum
3611170	Ruser not driven when read data chunking enabled

3.6.2.2 Bug Fixes/B-STARs

B-STAR	Description
9001505479	test timeout due to pending uvm objections from ace master vip
3394174	ACE master driver did not process consumed transactions, causing testbench timeout
9001325922	VIP: AXI, addr_width<32, compile error in dvm processing (dvm not used)
3272885	Incorrect description & sampling condition for system_ace_valid_*_channel_valid_overlap
3626973	rchunkstrb incorrect in one of the pattern

B-STAR	Description
3614039	VIP Master is not driving Z during idle periods for unique signals
3614037	When transaction does not assert AWUNIQ, master VIP waits for response to first transaction before sending next transaction, having same ID
3611522	Unique Id feature - Error-[OUTMEM] The tool has just run out of memory:
3611177	Is_valid check needs update to consider condition that ARSIZE need not be same as data_width, if ARLEN=0
3610687	Is_valid errors and Out of bound error
3604249	Compile errors seen with `SVT_AXI_MAX_ADDR_WIDTH defined to a value less than 32
3550194	ACE VIP master doesn't assert CRVALID for the last DVM COMPLETE transaction
3544647	VCATB ACE5-Lite master VIP Signal Connection issue for- AWATOP
3515107	ACE_Lite: DVMv8_4 issue in range based TLBI transactions
3514091	AX4_STREAM::tb_axi_svt_uvm_axi4stream_sys compilation issue with NCVSIM
3473569	ACE5:do_compare() mismatch for atomics transactions
3468237	ACE5 issue with Array assignments require equivalent element types (Array assignments require equivalent element types)
3468238	ACE5 ERROR! [FAILURE] AXI Master Transaction bypte_pack error for unsupported kind
3468239	ACE5 VMM WARNING [FAILURE] AXI Master Transaction stream_id multiple pattern definitions

3.6.3 Notes for Release R-2021.03

- Updated the VIP version as R-2021.03.
- Added support for Euclide (Eclipse based IDE) for lint rule checking. The VIP works seamlessly with Euclide IDE when configured with testbench rule setting and would not result in any fatal errors.
  - UVM 1.2 is supported without `UVM_NO_DEPRECATED` macro.

3.6.4 Notes for Release R-2020.12-3

- Updated the VIP version as R-2020.12-3.

3.6.4.1 Enhancements/E-STARs

E-STAR	Description
3538852	SVT AXI Bus protection: Port level configuration to enable/disable r52 bus protection signals
3538851	SVT AXI : Bus protection variable Wctl_code type need to be updated as an array
3541213	Monitor check that awstashnid_en and other stash signals should be zero for non stash transaction
3575667	is_valid checks to ensure that ace_version is set to ACE_VERSION_2_0 to enable all axi f,g ,h features,Also checks correct axi_interface_types for these features
3544516	Interface TDATA width is coming from SVT_AXI_MAX_TDATA_WIDTH instead SVT_AXI_TDATA_WIDTH_PARAM with param_if
3527739	Skip eos_unmapped_master_xact on aborted transactions due to reset

3.6.4.2 Bug Fixes/B-STARs

B-STAR	Description
3454424	data_integrity_with_outstanding_coherent_write_check incorrectly reported
3424677	master_slave_xact_data_integrity_check error for writeunique with icn merging sn
3459271	amba_svt_R-2020.09-3-T-20201117:NOA Error from system monitor
3446813	issue in handling multiple write forward cases
3540687	stashnid_en not deasserting based on xact type
3545521	stash_signals_valid_value_for_non_stash_xacts_check
3336273	[ACE] Compile error "Illegal select index in constraint"
3441976	AXI outstanding generation error
3557978	sequence response value can not match transaction value for axi wvalid_delay[ ]

3.6.5 Notes for Release R-2020.12

- Updated the VIP version as R-2020.12.

3.6.5.1 Enhancements/E-STARs

E-STAR	Description
None	-

3.6.5.2 Bug Fixes/B-STARs

B-STAR	Description
None	-

3.6.6 Notes for Release R-2020.09-3

- Updated the VIP version as R-2020.09-3.

3.6.6.1 Enhancements/E-STARs

E-STAR	Description
3417730	slave_data_integrity_check error with ATOMIC transaction due to error response
3350623	SM enhancement when interconnect optimize number of snoops

3.6.6.2 Bug Fixes/B-STARs

B-STAR	Description
3422790	Issue in updating AXI slave memory with update_mem_in_req_order is set and transaction has error response

3.6.7 Notes for Release R-2020.09-2

- Updated the VIP version as R-2020.09-2.

3.6.7.1 Enhancements/E-STARs

E-STAR	Description
3383004	Support for Atomic xacts attributes dumping into PA fsdb
3408509	No Ended Messages for the Snoop transactions with NORMAL verbosity
2886321	Enh for sys mon to correlate slave RD&WR xact pair for single master WRITE xact
3397363	Enh for user selecting specific transactions following partial write with read and write flow
3233773	master_slave_xact_data_integrity_check failing due to mismatch in bresp for posted writes xact

3.6.7.2 Bug Fixes/B-STARs

B-STAR	Description
3398651	MCSM: typo in error message
3413562	master-slave correlation logic incorrectly invokes address map APIs
3340755	trans_axi_snoop must be created only for ace, ace_lite+dvm agents
3356733	Incorrect is_valid check errors on tag_match_resp with any value for tag_op other than INVALID
3359855	ace5_lite:issues with constraints in axi master xacts for atomic transactions
3340767	issue with axi_back_to_back_read_burst_sequence,back_to_back_write_burst_sequence
3373475	SVT AXI5/ACE5: Random atomic transaction generation results in is_valid check failure
2717721	Hang due to num_oustanding_xact=-1 still seen in latest amba release

3.6.8 Notes for Release R-2020.09

- Verilog command support is deprecated from this release.
- Support for native performance analysis feature and corresponding performance checks is deprecated from this release. It is recommended to use Verdi Performance Analyzer for performance analysis using AXI VIP.

3.6.9 Notes for Release Q-2020.06-3

- Updated VIP version as Q-2020.06-3.

3.6.9.1 Enhancements/E-STARs

E-STAR	Description
None	-

3.6.9.2 Bug Fixes/ B-STARs

B-STAR	Description
3324494	The coverage bin WREADY_before_WVALID is not hit
3324496	The coverage bin ooo_depth_0 is not hit

3.6.10 Notes for Release Q-2020.06-2

- Updated VIP version as Q-2020.06-2.

3.6.10.1 Enhancements/E-STARs

E-STAR	Description
3310421	SVT AXI: VIP doesn't consider the actual interval for throughput calculation

3.6.10.2 Bug Fixes/ B-STARs

B-STAR	Description
3174998	data_integrity_with_outstanding_coherent_write_check due to ace master vip issue
3280116	ace master vip snoop channel hang
3237628	axi slave vip does not deassert axready as per num_*_outstanding_xact
3165906	End of data phase data.size is to 16 even though burst_length is not 16 with data before address
3279011	Passive Slave VIP:: write_data_phase_ended AXI callback

3.6.11 Notes for Release Q-2020.06-1

- Updated VIP version as Q-2020.06-1.

3.6.11.1 Enhancements/E-STARs

E-STAR	Description
3249194	READ reordering priority- highest value gets higher priority

B-STAR	Description
3133614	in AXI write_address_phase_ended is executed at start of addr phase for passive
3212048	AXI4 Slave VIP monitor errors out when arvalid is high even after reset
3215891	reordering_priority
3269821	Slave:: update data_trace_tag as per WTRACE signal
3284194	NOA error when AMBA system coverage is enabled and transaction from AHB to AXI
3283611	Incorrect address alignment error with single single beat and single byte data size transaction
3281083	NOA error from AMBA system monitor "svt_amba_system_monitor_common.sv"
3272217	ace5_lite slave must ignore awbar, arbar signals
3289179	SVT_AMBA_EXCLUDE_AHB_IN_AMBA_SYS_ENV results in compile error

3.6.12 Notes for Release Q-2020.06

- Updated VIP version as Q-2020.06.

3.6.12.1 Enhancements/E-STARs

E-STAR	Description
None	-

3.6.12.2 Bug Fixes/B-STARs

B-STAR	Description
None	-

3.6.13 Notes for Release Q-2020.03-3

- Updated VIP version as Q-2020.03-3.

3.6.13.1 Enhancements/E-STARs

E-STAR	Description
9001571772	Make sys mon assocn more precise by considering start addr for mst-slv matching

3.6.13.2 Bug Fixes/B-STARs

B-STAR	Description
3128984	UVM_FATAL from AMBA VIP during middle-of-test reset
3196465	ACE5: constraint solver failure with generating deallocating xacts
3175827	data_trace_tag field in axi_transaction is not giving correct value
3219204	Slave transaction object variable "data_trace_tag" not updated for WRITE xact
3140661	ACE5 cleansharedpersist not working with `SVT_AXI_IS_XACT_COHERENT_READ
3197584	addr_valid_delay not working for write transactions
3208569	ROMI/ROCI xacts hang on ace5_lite master vip
3208582	data_before_addr - reference_event_for_addr_valid_delay constraint issue

3.6.14 Notes for Release Q-2020.03

- Updated VIP version as Q-2020.03.
- Support for 256 byte data bus width.

3.6.15 Notes for Release Q-2019.12

- Updated VIP version as Q-2019.12.

- Added a new callback `svt_axi_master_callback::pre_data_stream_started` for AXI4 Stream. This is called just before driving the first transfer of a data stream transaction.
- Delay control for address valid with respect to last data_phase handshake of previous transaction.
- Support for VC-AutoTestbench for ACE5 signals.
- Support to generate one outstanding stream packet per TDEST.
- ACE5 coverage for Atomic, Untranslated transactions, cache stashing.
- Support for AXI Slave VIP to deassert wready until corresponding awvalid-awready handshake completes. This is supported through port configuration `svt_axi_port_configuration::wready_wait_for_awaddr_handshake`.

3.6.16 Notes for Release P-2019.09

- Updated VIP version as P-2019.09.
- Added coverage on AXI4 Stream Interleaving depth. Added the following cover group:
  - `trans_cross_axi4_stream_interleaving_depth`
- Added coverage on delays in AXI4 Stream. Added the following cover group:
  - `trans_axi4_stream_delay`
- Default sampling skew in AXI Interface updated from 0.01 to 1step for VCS.
- Support for ACE5 Atomic Transactions (Early Adopter feature).
- Support for IEEE 1800.2 UVM version.

3.6.17 Notes for Release P-2019.06

- Updated VIP version as P-2019.06.
- Enhanced AXI System Monitor messages for efficient debug.
- New APIs similar to `wait_for_transaction_end()` for addr and data phase ended.
- Support for suspending AWREADY signal from AXI Slave VIP. Added member `svt_axi_transaction::suspend_awready`.

3.6.18 Notes for Release P-2019.03

- Updated VIP version as P-2019.03.
- Support for coverage to track delays between channel handshakes.
- Enhancement to messages and information printed in log file by AXI VIP.
- Support in ACE System Monitor to handle address translation occurring between coherent address and snoop address.
- Support in ACE System Monitor to handle snoop filter back invalidation, when address is translated by Interconnect on Slave side.
- Coverage for out of order response count.
- AXI System monitor provides summary of orphaned transactions at the end of simulation.

3.6.19 Notes for Release O-2018.12

- Updated VIP version as O-2018.12.
- Added support for incdir flow.
- The default value of `svt_axi_system_configuration::display_summary_report` is changed from 0 to 6.
- The arguments for the method `svt_axi_system_configuration::get_dest_global_addr_from_master_addr` has undergone a change in this release.

3.6.20 Notes for Release O-2018.09

- Updated VIP and SVT version as O-2018.09.

3.6.21 Notes for Release O-2018.06-3

- The following table lists the new and changed features in this release.

Table 3-4 STAR Fix Information

STAR	Description
9001370872	[VCATB] Simulation acceleration of Performance Analyzer on AMBA VIP. Added a new enum label to `svt_xml_writer::format_type_enum` named `FSDB_PERF_ANALYSIS` to improve the runtime performance while dumping FSDB for performance analysis.
Internal	ACE-5: Support for Data Check and Poison.

3.6.22 Notes for Release O-2018.06

- Added port configuration member `svt_axi_port_configuration::is_downstream_coherent` to enhance AXI system monitor to process axi3 txns as ace-lite txns.
- Added port configuration member: `svt_axi_port_configuration::source_master_id_xmit_to_slaves_type_enum::CUSTOM_SOURCE_MASTER_ID_XMIT_TO_SLAVES`.

3.6.23 Notes for Release N-2018.03-1

- IsShared and PassDirty response control.
  Added `svt_axi_port_configuration::memory_update_for_pass_dirty_enable` configuration to support IsShared and PassDirty response control.
- Support for master to slave transaction correlation based on initiating master.
  Added `svt_axi_port_configuration::id_based_xact_correlation_master_enable` configuration to support master to slave transaction correlation.

3.6.24 Notes for Release N-2018.03

There are no new features for this release.

3.6.25 Notes for Release N-2017.12-1

- Added support for path coverage for ACE. This release only supports path coverage for ReadNoSnoop and WriteNoSnoop transaction types.
  Following cover group has been added:
  - `trans_cross_master_to_slave_path_access_ace`
- Added following signal stability checks in /amba_svt/src/svt_axi_checker.sv:
  - For WUSER:
    - `signal_valid_wuser_when_wvalid_high_check`
    - `signal_stable_wuser_when_wvalid_high_check`
  - For BUSER :
    - `signal_stable_buser_when_bvalid_high_check`
  - For RUSER :
    - `signal_stable_ruser_when_rvalid_high_check`
- Added a port configuration member in amba_svt/src/svt_axi_port_configuration.sv for setting all delays to zero:
  - `zero_delay_enable`
- Deprecated the following system monitor checks of port interleaving feature from system monitor:
  - `port_interleaving_addr_check`
  - `port_interleaving_device_dvm_check`

  The following port monitor check is added in port monitor to address the same functionality.
  - `port_interleaving_check`

3.6.26 Notes for Release N-2017.12-T-20171124

There are no new features for this release.

3.6.27 Notes for Release N-2017.12

The following are the updates for this release:

- VIP version updated as N-2017.12.
- SVT version updated as N-2017.12.
- Added support for VC AutoTestbench tool. See AXI VIP User Guide for more information.
- Added support for VC VIP AMBA AutoPerformance tool. Contact Synopsys for more information.

3.6.28 Notes for Release N-2017.09-3

There are no new features for this release.

3.6.29 Notes for Release N-2017.09-2

The following is the update for this release:

- Added variable `svt_axi_transaction::suspend_awready` to allow user to suspend/control behavior of awready signal from the active slave VIP.

- Added configuration member `svt_axi_port_configuration::shareable_exclusive_access_from_acelite_ports_enable`. For more details, see AXI Class Reference HTML.

3.6.30 Notes for Release N-2017.09-1

The following is the update for this release:

- Added method `svt_axi_system_configuration::get_interconnect_slave_route_port` to allow user to redefine the master to slave routing behavior in the interconnect VIP, and System Monitor.

3.6.31 Notes for Release N-2017.09

There are no new features for this release.

Note
From this release onwards, VIP will issue a Fatal message instead of Error message when a timeout for READY signal is detected.

3.6.32 Notes for Release M-2017.06-3

The following are the updates for this release:

- Added support for DVM Covergroups on Snoop channel.
- Support in AXI System Monitor for data integrity checks across the Interconnect DUT, which converts FIXED type transactions to INCR type transactions.
- Added configuration member `svt_axi_port_configuration::inactive_wdata_bytes_val`. This configuration parameter controls the value driven on WDATA signals, when wvalid is high and wstrb is low.
- Added configuration member `svt_axi_port_configuration::check_valid_data_bytes_only_enable`.

3.6.33 Notes for Release M-2017.06-2

The following are the updates for this release:

- Added new covergroup: `system_interleaved_ace_concurrent_outstanding_same_id`.
- Added the following AXI System Monitor callbacks:
  - `svt_axi_system_monitor_callback::pre_process_xact`
  - `svt_axi_system_monitor_callback::pre_process_snoop_xact`
  - `svt_axi_system_monitor_callback::pre_process_slave_xact`
  - `svt_axi_port_configuration::check_valid_data_bytes_only_enable` configuration attribute.
- The following covergroups slow down in IUS, if enabled using the `valid_ready_dependency_coverage_enable` port configuration:
  - `signal_master_slave_valid_ready_dependency`
  - `signal_master_valid_ready_dependency`
  - `signal_slave_master_valid_ready_dependency`
  - `signal_slave_valid_ready_dependency`

Note
By default, this configuration is disabled for IUS.

- Added support for single outstanding transaction per AxID for Non-Device and Non-DVM transactions. For more details, see "Single Outstanding Transaction Per AxID" in the *VC Verification IP AMBA AXI UVM/OVM User Guide*.
- Added support for Coherent Interleaved Ports. For more details, see "Interleaved Port Support" in the *VC Verification IP AMBA AXI UVM/OVM User Guide*.
- Added support for Master to Slave Path coverage. For more details, see "Master to Slave Path Coverage" in the *VC Verification IP AMBA AXI UVM/OVM User Guide*.

3.6.34 Notes for Release M-2017.06-1

This release was not promoted.

3.6.35 Notes for Release M-2017.06

The following are the updates for this release:

- Added the configuration member `svt_axi_port_monitor::push_coherent_xact_from_ic_scheduler_to_port_monitor`. This allows to specify any Coherent Interconnect DUT specific coherent to snoop transaction association information to the VIP.

Note
This feature is supported for UVM flow only.

- Added the following configuration and transaction members to support toggling of ready signals when the corresponding channel is idle:
  - `svt_axi_port_configuration::toggle_ready_signals_during_idle_period`
  - `svt_axi_transaction::idle_addr_ready_delay,`
  - `svt_axi_transaction::idle_wready_delay,`
  - `svt_axi_transaction::idle_rready_delay`
  - `svt_axi_transaction::idle_bready_delay`

3.6.36 Notes for Release M-2017.03-2

The following are the updates for this release:

- Added svt_axi_port_configuration::source_master_id_xmit_to_slaves_type and svt_axi_transaction::dynamic_source_master_id_xmit_to_slaves to support dynamic assignment of source ID corresponding to a master.
- Added support for AXI4 Stream for OVM and VMM flows.
- Added covergroup <trans_master_ace_dirty_data_write_one_ace_acelite>.
- Updated the construction of covergroup <trans_master_ace_cross_cache_line_dirty_data_write> for ACE_LITE master.
- Support for UVM_REG to AXI VIP adapter in the AXI Master agent.
- Added a port configuration variable svt_axi_port_configuration::allow_was_unique_zero_in_unique_state.

- ✦ The port configuration variable allows the VIP to accept snoop_resp_wasunique = 0 (or) 1.

❖ Added a port configuration variable svt_axi_port_configuration::default_cdready. This port configuration variable describes the default value of CDEADY signal.

4 AHB Verification IP Notes

These release notes describe the changes for S-2021.06 Version of the VC Verification IP for AMBA AHB.

4.1 Introduction

The AHB VIP supports verification of SoC designs that include interfaces implementing the AHB Specification.

The AHB Verification IP supports the following methodologies:

- UVM
- OVM

The AHB VIP supports following protocols:

- AHB-Lite
- AHB

4.2 Supported Methodology, OS, and Simulator Versions

This version of AHB VIP is qualified with version R-2020.12 of SystemVerilog Verification Technology (SVT). SVT is an internal portion of the VIP and provides base VIP functionality, some utilities, and support for installation and licensing.

This version supports SVT R-2020.12 and later. The version of SVT is the key for determining which versions of platform/OS and simulators have been qualified with this VIP. Whenever a new version of SVT is released, this VIP is qualified with it.

To determine the version of SVT in an existing DESIGNWARE_HOME installation, use:

```
$DESIGNWARE_HOME/bin/dw_vip_setup -i home
```

Xcelium Simulator 19.09.004 is not supported in AMBA VIP release Q-2020.03.

To avoid ICDPAV (Illegal Combination of Driver and Procedural Assignment to Variable) error/warning from IUS simulator, use the Bind interface provided with the VIP. Refer to tb_axi_svt_uvm_intermediate_sys example for usage of bind interface.

This table lists the supported methodology versions.

Table 4-5 Supported Methodology Versions

Methodology	Supported Version	Unsupported Version
OVM	2.1.2	2.1.1_3
UVM	1.1d, 1.2, 1800.2-2017-1.0, 1800.2-2017-1.1	1.1a
VMM	1.1, 1.2	NA

4.2.1 Supported Simulator Platforms

The simulator matrix table is available at the following location:

VC VIP Library page
https://spdocs.synopsys.com/dow_retrieve/latest/vg/snps_vip_lib/PDFs/simulator_matrix.pdf

For more information on the simulator matrix and library level updates, see VC VIP Library Release Notes.

Table 4-6 shows the list of methodologies supported with the simulators.

Table 4-6 Supported Methodologies with Simulators

Methodology	VCS	Xcelium	Questasim
UVM 1.1d, 1.2	Supported	Supported	Supported
UVM 1800.2-2017-1.0, 1800.2-2017-1.1	Supported	Not yet supported	Not yet supported
OVM	Supported	Supported	Supported
VMM	Supported	N/A	N/A

4.3 Known Issues and Limitations

- Dynamic reset not supported for AHB VIP.
- In AHB System Monitor, data integrity system check is not supported for overlapping Write transactions.
- In Master & Slave, trace array generation for Split/Retry/EBT transactions is not supported in Passive mode.
- Compilation failure may occur for the following combination of methodology, simulator and platform:

  UVM, IUS (irun flow), Suse 10.0/11.0.

  If you observe a compilation failure with this combination, add "-gcc_vers 4.1" to the irun command line.
- Locked transactions are not yet supported in Bus component.
- Protocol Analyzer is currently supported on UVM and OVM flow, and not yet supported on VMM flow.
- AMBA VIP does not support MTI 10.3 version.

- Class reference HTML has a known issue in release J-2014.12-SP2-1. The argument names of public methods are not displayed correctly. The argument names appear as the method name.
- Terminating INCR transaction with BUSY is not yet supported.
- svt_ahb_master_configuration::nseq_in_second_cycle_error_response_for_single_burst is only supported for continuous SINGLE bursts.
- AHB5 feature is not supported on VMM flow.
- AHB5 Exclusive access feature is not yet supported.
- AHB5 feature Locked sequence with IDLE transfers is not yet supported.
- `tb_ahb_svt_uvm_basic_ral_sys` and `tb_ahb_svt_uvm_basic_active_passive_sys` are not supported for IUS simulator.
- The following examples are not supported on IUS simulator:
  - `tb_ahb_svt_uvm_basic_active_passive_sys`
  - `tb_ahb_svt_uvm_basic_ral_sys`
- IEEE Encryption and Incdir flow is supported in VCS and MTI simulators only. For more details, see the sections 2.6 and 2.7 in the VC VIP Library Installation Guide.
- No beat level info separation. The whole array is shown in PA.
- Euclide lint check errors are expected in UVM 1.2 with `UVM_NO_DEPRECATED` macro.
- Euclide lint check is not supported with IEEE 1800.2 UVM.
- Supported with VCS versions 2020.12-SP1 or later.
- Compatible with UVM Version 1.1d.

4.4 Documentation

After the VIP is downloaded and installed, product documentation resides at:

```
$DESIGNWARE_HOME/vip/AMBA SVT/latest/doc/
```

The documentation consists of the following:

- AHB UVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/ahb_svt_uvm_user_guide.pdf`
- AHB UVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/ahb_svt_uvm_class_reference/html/index.html`
- AHB OVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/ahb_svt_ovm_user_guide.pdf`
- AHB OVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/ahb_svt_ovm_class_reference/html/index.html`
- AHB UVM Basic example Quickstart is located at:

  $DESIGNWARE_HOME/vip/svt/amba_svt/latest/examples/sverilog/tb_ahb_svt_uvm_basic_sys/doc/index_basic.html
- Verification Plans: Pointer to directory with README and *.xml files:

```
$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/VerificationPlans/README
$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/VerificationPlans/*.xml
```

Note For Test Suite, contact Synopsys.

Attention Beginning in December 2014 with the J-2014.12 release, Synopsys Verification IP products adopt the release version format recommended by the company. The new version format is:

<alphabet>-<year>.<month>

<alphabet> is a single letter corresponding to the QSC foundation that the release is compliant with.
<year> is a 4-digit number corresponding to the year of the release.
<month> is a 2-digit number corresponding to the month of the release.

For patch releases, a "-<patch_number>" is appended to the release version.
For Service Pack releases, a "-SP<number>" is appended to the release version.

For example:

J-2014.12	Release in December 2014 that is compliant with the J foundation
J-2014.12-1	First patch on the J-2014.12 release
J-2014.12-SP1	First Service Pack release for J-2014.12

Note Version 2.93a was the last release before the version change.

4.5 Notes for Release S-2021.06

- Updated the VIP version as S-2021.06.
- VIP is compatible with VCS +lint= LRM_1800_2009 option.

4.5.1 Enhancements/E-STARs

E-STAR	Description
3595141	Using ahb5 and ahbv6 vip agents in same TB

4.5.2 Bug Fixes/B-STARs

B-STAR	Description
None	-

4.6 Notes for Previous Releases

4.6.1 Notes for Release R-2021.03-2

- Updated the VIP version as R-2021.03-2.

4.6.1.1 Enhancements/E-STARs

E-STAR	Description
None	-

4.6.1.2 Bug Fixes/B-STARs

B-STAR	Description
3580220	SVT AHB VIP : Num busy cycles value reported is incorrect
3483103	AHB active master driving X on HWDATA during RETRY response
3637173	Active Master starts transaction with Htrans=IDLE

4.6.2 Notes for Release R-20201.03-1

- Updated the VIP version as R-2021.03-1.

4.6.3 Notes for Release R-2021.03

- Updated the VIP version as R-2021.03.
- Added support for Euclide (Eclipse based IDE) for lint rule checking. The VIP works seamlessly with Euclide IDE when configured with testbench rule setting and would not result in any fatal errors.
  - UVM 1.2 is supported without `UVM_NO_DEPRECATED` macro.

4.6.4 Notes for Release R-2020.12-3

- Updated the VIP version as R-2020.12-3.

4.6.4.1 Enhancements/E-STARs

E-STAR	Description
None	-

4.6.4.2 Bug Fixes/B-STARs

B-STAR	Description
3462208	AHB checker arbiter_asserted_multi_hgrant doesn't get fired
3568179	Seeing NOA while using the AHB VIP in passive mode

4.6.5 Notes for Release R-2020.12

- Updated the VIP version as R-2020.12.

4.6.5.1 Enhancements/E-STARs

E-STAR	Description

4.6.5.2 Bug Fixes/B-STARs

B-STAR	Description
-	-

4.6.6 Notes for Release R-2020.09-3

- Updated the VIP version as R-2020.09-3.

4.6.6.1 Enhancements/E-STARs

E-STAR	Description

4.6.6.2 Bug Fixes/B-STARs

B-STAR	Description
-	-

4.6.7 Notes for Release R-2020.09-2

- Updated the VIP version as R-2020.09-2.

4.6.7.1 Enhancements/E-STARs

E-STAR	Description
3238775	Amba HVP plans for AHB

4.6.7.2 Bug Fixes/B-STARs

B-STAR	Description
-	-

4.6.8 Notes for Release R-2020.09

- Support for native performance analysis feature and corresponding performance checks is deprecated from this release. It is recommended to use Verdi Performance Analyzer for performance analysis using AHB VIP.

4.6.8.1 Enhancements/E-STARs

E-STAR	Description
None	-

4.6.8.2 Bug Fixes/B-STARs

B-STAR	Description

4.6.9 Notes for Release Q-2020.06-3

- Updated the Release version as Q-2020.06-3.

4.6.9.1 Enhancements/E-STARs

E-STAR	Description
None	-

4.6.9.2 Bug Fixes/B-STARs

B-STAR	Description
3324089	AHBv6 active master data array different for WRAP4 READ xacts
3308232	issue with the implementation of get_response_assertion_time()

4.6.10 Notes for Release Q-2020.06-2

- Updated the Release version as Q-2020.06-2.

4.6.10.1 Enhancements/E-STARs

E-STAR	Description
3238775	Updated HVP plans for AHB
3320971	READ USER data in xact not same as interface for ERROR response

4.6.10.2 Bug Fixes/B-STARs

B-STAR	Description
3331699	AHB hlock check misfired for ahb_lite
3310463	Compile error when macro "SVT_AHB_MON_CFG_BASED_COV_GRP_DEF" is enabled

4.6.11 Notes for Release Q-2020.06-1

- Added the configuration variable `svt_ahb_slave_configuration::rebuild_after_multilayer_interconnect_termination` that allows you to enable rebuilding of the slave transaction aborted due to multilayer interconnect termination. The slave does not rebuild by default.

4.6.11.1 Enhancements/E-STARs

E-STAR	Description
N.A	-

4.6.11.2 Bug Fixes/B-STARs

B-STAR	Description
3172673	Arbiter didn't keep master granted for an additional transfer after a locked seq
3262724	Passive AHB slave hangs waiting for re-building ABORTED transaction

4.6.12 Notes for Release Q-2020.06

- Updated VIP version as Q-2020.06.

4.6.13 Notes for Release Q-2020.03-3

- Updated VIP version as Q-2020.03-3.

4.6.14 Notes for Release Q-2020.03

- Updated VIP version as Q-2020.03

4.6.15 Notes for Release Q-2019.12

- Simultaneous support for both 'continue on error' and 'abort on error' policies in AXI Slave VIP through the configuration member `svt_ahb_master_configuration::allow_both_continue_and_abort_on_error_resp_policy`.

4.6.16 Notes for Release P-2019.09

- Support for IEEE 1800.2 UVM version.

4.6.17 Notes for Release P-2019.06

- Updated VIP version as P-2019.06.
- There are no new features supported in this release.

4.6.18 Notes for Release P-2019.03

- There are no new features for this release.

4.6.19 Notes for Release O-2018.12

- Updated VIP version as O-2018.12.
- Added support for incdir flow.

4.6.20 Notes for Release O-2018.09

- Updated VIP and SVT version as O-2018.09.
- AHB5 features will be enabled through VIP-AMBA-AHB5-SVT, instead of VIP-AMBA-AHB-SVT, from this release. VIP-LIBRARY-SVT license will continue to enable AHB5 features.

4.6.21 Notes for Release O-2018.06-3

There are no new features for this release.

4.6.22 Notes for Release O-2018.06

There are no new features for this release.

4.6.23 Notes for Release N-2018.03-1

There are no new features for this release.

4.6.24 Notes for Release N-2018.03

- Added support for Lock transactions in AHB Bus VIP.

4.6.25 Notes for Release N-2017.12-1

There are no new features for this release.

4.6.26 Notes for Release N-2017.12-T-20171124

There are no new features for this release.

4.6.27 Notes for Release N-2017.12

The following are the updates for this release:

- VIP version updated as N-2017.12.
- SVT version updated as N-2017.12.
- Added support for VC AutoTestbench tool. See AHB VIP User Guide for more information.

4.6.28 Notes for Release N-2017.09-3

- Added callback method `svt_ahb_system_monitor_callback::pre_check_execute`, which gets called before AHB System Monitor executes `data_integrity` check.

4.6.29 Notes for N-2017.09-2

- Added configuration variable `svt_ahb_configuration::data_busy_value` to allow user to control the values driven on HWDATA / HRDATA lanes of the BUS when HTRANS is BUSY.
- Added new variable `svt_ahb_slave_transaction::suspend_response` to allow the user to control the driving of response. If the variable is set to 1, it will override the effect of existing VIP programmable attribute `svt_ahb_slave_transaction::num_wait_cycles`, which is used to introduce wait cycles from the slave.

4.6.30 Notes for N-2017.09-1

Added `member svt_ahb_transaction::termination_status`. Currently, only `ABORTED_DUE_TO_RESET` value is supported.

4.6.31 Notes for Release N-2017.09

There are no new features for this release.

4.6.32 Notes for Release M-2017.06-3

Added member `svt_ahb_transaction::termination_status`, to provide information on why any given transaction was aborted.

4.6.33 Notes for Release M-2017.06-2

There are no new features for this release.

4.6.34 Notes for Release M-2017.06-1

There are no new features for this release.

4.6.35 Notes for Release M-2017.06

The following is the update for this release:

If you are using AHB5 feature, then you need to define the macro `SVT_AHB5_ENABLE` in `svt_ahb_user_defines.svi` files. For more information on n how to define a macro using user defines file, see Overriding System Constants section from the AHB User Guide. For more information on supported AHB5 features, see Support for AHB5 Features section from the AHB User Guide.

4.6.36 Notes for Release M-2017.03-2

The following are the updates for this release:

- Added system level protocol check decoder_not_asserted_any_hsel, which is enabled through AHB system configuration member svt_ahb_system_configuration::decoder_hsel_assert_check

4.6.37 Notes for Release M-2017.03

There are no new features for this release.

4.6.38 Notes for Release M-2016.12-2

The following are the updates for this release:

- Added support for following cover groups:
  - trans_ahb_hready_in_when_hsel_high
  - trans_ahb_hresp_first_beat
  - trans_ahb_hresp_first_beat_ahb_lite
  - trans_ahb_beat_hresp_transistion_continue_on_error_ahb_full
  - trans_ahb_beat_hresp_transistion_continue_on_error_ahb_lite
  - trans_ahb_beat_hresp_transistion_abort_on_error_ahb_full
  - trans_ahb_beat_hresp_transistion_abort_on_error_ahb_lite
  - trans_ahb_idle_to_nseq_hready_low
  - trans_ahb_htrans_cov_diff_xact_ahb_full
  - trans_ahb_hresp_all_beat_ahb_full
  - trans_ahb_hresp_all_beat_ahb_lite

- Added support for AHB UVM Basic example Quickstart html documentation.

4.6.39 Notes for Release M-2016.12

There are no new features for this release.

4.6.40 Notes for Release L-2016.09-3

The following are the updates for this release:

Old Name	New Name
hready_out_from_slave_high_during_reset	hready_out_from_slave_not_X_or_Z_during_reset
hready_out_from_slave_high_when_data_phase_not_pending	hready_out_from_slave_not_X_or_Z_when_data_phase_not_pending

4.6.41 Notes for Release L-2016.09-2

The following are the updates for this release:

Support for AHB5 Extended Memory Types. The Configuration member `svt_ahb_configuration::extended_mem_enable` has been added to enable this feature. See the HTML Class Reference and User Guide for more information.

4.6.42 Notes for Release L-2016.09

There are no new features for this release.

4.6.43 Notes for Release L-2016.06-3

There are no new features for this release.

4.6.44 Notes for Release L-2016.06-2

There are no new features for this release.

4.6.45 Notes for Release L-2016.06-1

The following are the new features for this release:

- Added the following methods to support adding of external AHB master and slave agents in to the AHB system environment.
  - `svt_ahb_master_agent::set_external_agents_props` which is used to set the port id and port configuration of the external master.
  - `svt_ahb_system_env::set_external_master_agent`
  - `svt_ahb_slave_agent::set_external_agents_props` which is used to set the port id and port configuration of the external slave.
  - `svt_ahb_system_env::set_external_slave_agent`
- Added the following member for support of AHB3 Lite Spec feature - Termination of INCR burst with BUSY transfer:
  - `svt_ahb_configuration::end_incr_with_busy`

4.6.46 Notes for Release L-2016.06

The following new feature is added for this release:

- Added support for AHB performance metrics through Verdi. See the User Guide for more details.

4.6.47 Notes for Release L-2016.03-3

The following new feature is added for this release:

- Added the following member for support of AHB3 Lite Spec feature - Termination of INCR burst with BUSY transfer:
- svt_ahb_configuration::end_incr_with_busy

4.6.48 Notes for Release L-2016.03-2

There are no new features for this release.

4.6.49 Notes for Release L-2016.03-1

STAR fixes only

4.6.50 Notes for Release L-2016.03

The following new features are added for this release:

- Added the following additional members for performance analysis feature:
  - `svt_ahb_system_configuration:: display_perf_summary_report`
  - `svt_ahb_configuration::perf_exclude_inactive_periods_for_throughput`

4.6.51 Notes for Release K-2015.12-2

STAR fixes only

4.6.52 Notes for Release K-2015.12-1

The following new features are added in this release:

- Support for configuring more than one AHB-Lite masters in AHB System Env to support AHB Multilayer interconnects.
  - Added member svt_ahb_system_configuration::ahb_lite_multilayer

    Refer to AHB Class Reference Documentation and User Guide for more details.

4.6.53 Notes for Release K-2015.12

The following new features are added in this release:

- Support for protocol check illegal_default_slave_resp_to_nseq_seq
- Support for SVT AHB transaction timeouts svt_ahb_configuration::wait_state_timeout and svt_ahb_configuration::xact_timeout

  Refer to AHB Class Reference documentation for more details.

4.6.54 Notes for Release K-2015.09-2

- Support for following AHB checks:
  - illegal_default_slave_resp_to_nseq_seq
  - read_xact_on_read_only_slave_addr_region
  - write_xact_on_write_only_slave_addr_region
- Added support for Slave Region Range based on Slave Address range svt_ahb_system_configuration::slave_addr_range::set_region_range

4.6.55 Notes for Release K-2015.09-1-T0922

There are no new features for this release.

4.6.56 Notes for Release K-2015.09-1

STAR fixes only.

4.6.57 Notes for Release K-2015.09

The following new features are added in this release:

- Support for native dumping of FSDB. Refer to member `svt_ahb_configuration::pa_format_type` in Class Reference HTML.

4.6.58 Notes for Release K-2015.09-Beta

There are no new features for this release.

4.6.59 Notes for Release J-2014.12-SP2-1

The following change has been made in this release:

- Support for output signals to be initialized to '0' at time 0 is added. Configuration parameter svt_ahb_configuration::initialize_output_signals_at_start has been added.

4.6.60 Notes for Release J-2014.12-SP2

There are no new features for this release.

4.6.61 Notes for Release J-2014.12-SP1-3-T0507

The following changes have been made in this release:

- Added `svt_ahb_system_configuration::system_coverage_enable` configuration parameter to enable system level coverage.
- Added the following AHB covergroups:
  - trans_ahb_hmaster
  - trans_ahb_hburst_transition
  - trans_ahb_htrans_transition_write_xact
  - trans_ahb_htrans_transition_write_xact_hready
  - trans_ahb_htrans_transition_read_xact

- trans_ahb_htrans_transition_read_xact_hready
- trans_cross_ahb_htrans_xact
- trans_cross_ahb_hburst_hlock_hsize
- trans_cross_ahb_burst_with_busy
- trans_cross_ahb_hburst_num_wait_cycles
- system_ahb_all_masters_grant
- system_ahb_all_masters_busreq
- system_ahb_cross_all_masters_busreq_grant
- system_ahb_all_slaves_selected
- system_ahb_two_slaves_selection_sequence
- system_ahb_four_slaves_selection_sequence
- system_ahb_eight_slaves_selection_sequence
- system_ahb_sixteen_slaves_selection_sequence

4.6.62 Notes for Release J-2014.12-SP1-3-T0430

There are no new features for this release.

4.6.63 Notes for Release J-2014.12-SP1-3

The following changes have been made in this release:

- Added a compile time macro `SVT_AMBA_DEFAULT_COV_ENABLE` for enabling functional coverage by default.

4.6.64 Notes for Release J-2014.12-SP1-2

The following changes have been made in this release:

- Added the attribute `svt_ahb_system_configuration::master_error_response_policy[]` of type `svt_ahb_system_configuration::error_response_policy_enum` to support per master control for error response policy.
- Added support for generating `IDLE_XACT` with specified `haddr` from active master. Added the attribute `svt_ahb_configuration::idle_xact_hwrite` of type `rand bit` to support generating `IDLE_XACT` transactions with `hwrite` asserted from active AHB master.
- Updated the Active master such that the address (`svt_ahb_master_transaction::addr`) of `IDLE_XACT` (when `svt_ahb_master_transaction::xact_type = svt_ahb_master_transaction::IDLE_XACT`) will be aligned to burst size (`svt_ahb_master_transaction::burst_size`) and will fall within 1K boundary as per burst type (`svt_ahb_master_transaction::burst_type`)
- Added the following protocol checks:
  - grant_to_default_master_during_allmaster_split
  - illegal_default_slave_resp_to_nseq_seq
  - illegal_hgrant_on_split_resp
  - mask_hgrant_until_hsplit_assert

4.6.65 Notes for Release J-2014.12-SP1-1

The following change has been made in this release:

- Added `svt_ahb_system_configuration::ahb3` configuration parameter for support of AHB3-Lite feature.

4.6.66 Notes for Release J-2014.12-SP1

The following changes have been made in this release:

- Names of Verification Plans have been updated for consistency across VIP titles.
- Session file `waves.rc` file for Verdi provided in example installation.
- Support for Debug Automation added. Refer to AHB User Guide for more details.
- `-doc` option added to `dw_vip_setup` script. Refer to AHB User Guide for more details.

Note

Pre J-2014.12-SP1 AMBA VIP test benches will have compilation errors if other J-2014.12-SP1 VIPs are installed. The compilation error is as follows:

```
Error-[MFNF] Member not found
/DESIGNWARE_HOME/vip/svt/amba_svt/J-
2014.12/ahb_master_agent_svt/sverilog/src/vcs/svt_ahb_tlm_gp_sequence_collection.
svp, 59
"this.req."
  Could not find member 'priority_start' in class 'uvm_tlm_generic_payload',
  at
  "../...../uvm1.1/tlm2/uvm_tlm2_generic_payload.svh"
```

To avoid compilation errors,

- update to J-2014.12-SP1 AMBA VIP

  or

- add `SVT_UVM_UTIL_DISABLE_SEQ_MACRO_ACCEL` on the simulator compile command line to run in backward compatible mode. However, this macro excludes a compilation performance improvement change.

4.6.67 Notes for Release J-2014.12-2-T0116

There are no new features for this release.

4.6.68 Notes for Release J-2014.12-T0107

Added a new member `svt_ahb_transaction::all_beat_response[]` to store the responses for all the completed beats of transaction.

4.6.69 Notes for Release J-2014.12-T1219

There are no new features for this release.

4.6.70 Notes for Release J-2014.12-1

There are no new features for this release.

4.6.71 Notes for Release J-2014.12

The following changes have been made in this release:

- Provided examples for dumping FSDB files for viewing waveform
- The *VC Verification IP AMBA AHB UVM Getting Started Guide* is newly provided from this release onwards. It presents information about integrating the VC VIP for AHB (referred to as VIP) into testbenches that are compliant with the SystemVerilog Universal Verification Methodology (UVM).

4.6.72 Notes for Release 2.93a

STAR fixes only.

4.6.73 Notes for Release 2.92a

- There are no new features for this release.

4.6.74 Notes for Release 2.91a

The following changes have been made in this release:

- Added support for UVM 1.2.
- Added a basic UVM example called `tb_ahb_svt_uvm_basic_program_sys`.
  This example demonstrates the usage of program block. It is supported only on the VCS simulator.
- Following checks are added to the `svt_ahb_checker` checker:
  - `hready_out_from_bus_high_during_reset`
  - `hready_out_from_slave_high_during_reset`
  - `htrans_idle_during_reset`
  - `hready_out_from_slave_high_when_data_phase_not_pending`

4.6.75 Notes for Release 2.90a

- There are no new features for this release.

4.6.76 Notes for Release 2.89a

- There are no new features for this release.

4.6.77 Notes for Release 2.88a

- There are no new features for this release.

4.6.78 Notes for Release 2.87a

- There are no new features for this release.

4.6.79 Notes for Release 2.86a

- There are no new features for this release.

4.6.80 Notes for Release 2.85a

- There are no new features for this release.

4.6.81 Notes for Release 2.80b

- There are no new features for this release.

4.6.82 Notes for Release 2.82a

- There are no new features for this release.

4.6.83 Notes for Release 2.81a

- There are no new features for this release.

4.6.84 Notes for Release 2.80a

- Support added for maximum number of retries by AHB Master VIP component

4.6.85 Notes for Release 2.75a

Support added to assert `hbusreq` even if bus ownership is granted and `svt_ahb_master_configuration::assert_hbusreq_for_one_cycle_after_bus_ownership_granted` member added.

4.6.86 Notes for Release 2.73a

There are no new features for this release.

4.6.87 Notes for Release 2.72a

There are no new features for this release.

4.6.88 Notes for Release 2.71a

There are no new features for this release.

4.6.89 Notes for Release 2.70a

There are no new features for this release.

4.6.90 Notes for Release 2.65a

There are no new features for this release.

4.6.91 Notes for Release 2.62a

There are no new features for this release.

4.6.92 Notes for Release 2.60a

There are no new features for this release.

4.6.93 Notes for Release 2.59a

There are no new features for this release.

4.6.94 Notes for Release 2.57a

Support for using AHB Bind interface with components configured in passive mode has been added.

4.6.95 Notes for Release 2.56a

There are no new features for this release.

4.6.96 Notes for Release 2.55a

- Support for user signals has been added for data bus. The following variables are added to support this feature:
  - `svt_ahb_transaction::data_huser`
  - `svt_ahb_configuration::data_huser_enable`
  - `svt_ahb_configuration::data_huser_width`
  - `Signal hwdata_huser has been added to svt_ahb_master_if`
  - `Signal hrdata_huser has been added to svt_ahb_slave_if`
- Protocol check coverage support has been added. The following variables are added to support this feature:
  - `svt_ahb_configuration::protocol_checks_coverage_enable`
  - `svt_ahb_system_configuration::protocol_checks_coverage_enable`

4.6.97 Notes for Release 2.54a

There are no new features for this release.

4.6.98 Notes for Release 2.53a

There are no new features for this release.

4.6.99 Notes for Release 2.52a

There are no new features for this release.

4.6.100 Notes for Release 2.51a

There are no new features for this release.

4.6.101 Notes for Release 2.50a

There are no new features for this release.

4.6.102 Notes for Release 2.48a

There are no new features for this release.

4.6.103 Notes for Release 2.47a

There are no new features for this release.

4.6.104 Notes for Release 2.45a

There are no new features for this release.

4.6.105 Notes for Release 2.44a

There are no new features for this release.

4.6.106 Notes for Release 2.43a

There are no new features for this release.

4.6.107 Notes for Release 2.42a

There are no new features for this release.

4.6.108 Notes for Release 2.41a

There are no new features for this release.

4.6.109 Notes for Release 2.40a

There are no new features for this release.

4.6.110 Notes for Release 2.39a

There are no new features for this release.

4.6.111 Notes for Release 2.38a

- New license features VIP-AMBA3-SVT and VIP-AMBA4-OPT-SVT have been added.
- Asynchronous reset support has been added. Therefore, the reset assertion will now be detected by the VIP asynchronously.
- AHB Slave GP support.

4.6.112 Notes for Release 2.37a

There are no new features for this release.

4.6.113 Notes for Release 2.36a

Fixed the TLM GP transaction to limit the extension beyond the 1k threshold. Thus, the TLM GP transaction is divided into multiple AXI transactions, to avoid the extension beyond the 1k threshold.

4.6.114 Notes for Release 2.35a

There are no new features for this release.

4.6.115 Notes for Release 2.30a

There are no new features for this release.

4.6.116 Notes for Release 2.29a

There are no new features for this release.

4.6.117 Notes for Release 2.28a

There are no new features for this release.

4.6.118 Notes for Release 2.27a

There are no new features for this release.

4.6.119 Notes for Release 2.26a

- STAR fixes

4.6.120 Notes for Release 2.25a

There are no new features for this release.

4.6.121 Notes for Release 2.20a

- Support for UVM TLM Generic Payload for AHB Verification IP has been added.

4.6.122 Notes for Release 2.16a

There are no new features for this release.

4.6.123 Notes for Release 2.15a

There are no new features for this release.

4.6.124 Notes for Release 2.14a

There are no new features for this release.

4.6.125 Notes for Release 2.13a

There are no new features for this release.

4.6.126 Notes for Release 2.12a

There are no new features for this release.

4.6.127 Notes for Release 2.11a

There are no new features for this release.

4.6.128 Notes for Release 2.10a

There are no new features for this release.

4.6.129 Notes for Release 2.05a

There are no new features for this release.

4.6.130 Notes for Release 2.03a

There are no new features for this release.

4.6.131 Notes for Release 2.02a

There are no new features for this release.

4.6.132 Notes for Release 2.01a

There are no new features for this release.

4.6.133 Notes for Release 2.00a

There are no new features for this release.

4.6.134 Notes for Release 1.99a

There are no new features for this release.

4.6.135 Notes for Release 1.98a

There are no new features for this release.

4.6.136 Notes for Release 1.97a

There are no new features for this release.

4.6.137 Notes for Release 1.96a

There are no new features for this release.

4.6.138 Notes for Release 1.95a

There are no new features for this release.

4.6.139 Notes for Release 1.90a

- STAR fixes

4.6.140 Notes for Release 1.81a

- Support for 128 AHB Masters and Slaves has been added in AHB System Env. Previously, AHB System Env supported up to 16 masters and slaves.
- Support for detection and tracking of rebuild transactions in Passive mode due to EBT (Early Burst Termination) condition has been added.

4.6.141 Notes for Release 1.80a

There are no new features for this release.

4.6.142 Notes for Release 1.79a

- STAR fixes

4.6.143 Notes for Release 1.78a

- STAR fixes

4.6.144 Notes for Release 1.77a

- Support for non-OKAY response in Passive mode has been added.
- STAR fixes

4.6.145 Notes for Release 1.76a

- Support has been added for mapping of two or more AHB slaves to the same address range.

  For details, refer to member svt_ahb_system_configuration::allow_slaves_with_overlapping_addr in AHB HTML Class Reference Manual.
- Support has been added to allow passive AHB slave memory to be updated according to read data seen in the transaction coming from the slave.

  For details, refer to member svt_ahb_slave_configuration::memory_update_for_read_xact_enable in AHB HTML Class Reference Manual.

4.6.146 Notes for Release 1.75a

- Support for parameterized interface has been added.

  An example tb_ahb_svt_uvm_basic_param_if_sys has been added to demonstrate the usage of parameterized interface. Checks for parameterized interface have been added, which check that the parameter values for signal widths are less than or equal to the max footprint of the signal. Refer to AHB User Guide and HTML Class Reference Manual for more details.

4.6.147 Notes for Release 1.70a

- Protocol Analyzer support has been added.

  Note that Protocol Analyzer is currently supported on UVM and OVM flow, and not yet supported on VMM flow.

4.6.148 Notes for Release 1.66a

- Support for AHB Verification Plans has been added.

  Refer to $DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/VerificationPlans/README
- STAR fixes

4.6.149 Notes for Release 1.65a

- Support for Lock transactions in master and slave component has been added.
- Bug fixes

4.6.150 Notes for Release 1.64a

- Two members svt_ahb_system_configuration::common_clock_mode and svt_ahb_system_configuration::common_reset_mode have been added.

  Refer to the AHB Class Reference Manual for more details.

4.6.151 Notes for Release 1.63a

- Bug Fixes

4.6.152 Notes for Release 1.62a

- VMM methodology support has been added:
  - Components:
    - AHB Master group, AHB Slave group, AHB System monitor, AHB System group
  - Protocol features:
    - AHB-Lite
    - Full AHB including Split/Retry support
    - Support in Master, Slave for rebuilding transaction:

      when there is Early Burst Termination (EBT) from arbiter

      when there is a SPLIT/RETRY response
    - Support for rebuild with burst type SINGLE
  - Verification features:
    - AHB-Lite, full AHB protocol checks
    - Debug port for AHB components
    - Support for AHB sideband signals
    - Beat level callbacks
    - Ability in master and slave to continue on ERROR response
    - Endian support
    - Performance Analysis support
  - Flow:
    - Only with VCS and VMM
  - Examples:
    - AHB VMM Basic example
- VMM methodology support – Features not yet supported:
  - Components:
    - AHB Bus and its sub components

4.6.153 Notes for Release 1.61a

- AMBA System Monitor in AMBA System Env component now supports checks across multiple AHB System Env components. Before this, AMBA System Monitor could do system checks when there was only one AHB System Env in the system. AMBA System Monitor already supports system checks with multiple AXI and APB System Env components in the system.

4.6.154 Notes for Release 1.60a

- For testbenches using more than one title out of AXI, AHB and APB, users can now import AXI/AHB/APB packages independently. The previous release 1.55a had a limitation that importing AXI/AHB/APB packages independently caused compilation failure. Refer to Release Notes for release 1.55a for details.
- Support for rebuild with burst type SINGLE has been added. Refer to member svt_ahb_master_configuration::rebuild_burst_type in AHB Class Reference Manual.

4.6.155 Notes for Release 1.55a

There are no new features for this release.

4.6.155.1 Known Limitation

- In testbenches which use AXI and AHB VIP components, importing AXI and AHB packages independently causes the following compilation error:

```
Error-[SE] Syntax error
  Following verilog source has syntax error :
        token 'svt_amba_perf_rec_base' should be a valid type. Please declare it virtual
if it is an Interface.
  "/global/apps/dw_latest/vip/svt/amba_svt/1.55a/sverilog/src/vcs/svt_ahb_common.svp",
  105: token is ';'
    svt_amba_perf_rec_base  perf_rec_queue[$];
```

To resolve this, import AMBA package instead of importing AXI and AHB packages independently Example code for UVM present in top.sv file is given below:

```
`include "svt_amba.uvm.pkg"
import svt_amba_uvm_pkg::*;
```

4.6.156 Notes for Release 1.51a

- Performance Analysis support has been added.

  Refer to the group "performance_analysis" in class svt_ahb_configuration in the AHB Class Reference Manual. Performance Analysis feature is not yet supported in VMM and Verilog command flows. Currently, it is supported only in UVM & OVM flows.

4.6.157 Notes for Release 1.50a

- Support for AHB Bus VIP
  - Early Burst Termination

    The following members have been added to support Early Burst Termination:
    - svt_ahb_bus_configuration::ebt_enable
    - svt_ahb_bus_configuration::num_ebt_cycles[]
    - svt_ahb_bus_configuration::num_mask_grant_cycles_after_ebt[]
  - Split Responses

    Bus VIP observes the HSPLIT signals of the slaves and grants the requesting masters accordingly.

    Refer to the AHB Class Reference Manual for more details.
- Support for additional AHB Protocol checks has been added.

4.6.158 Notes for Release 1.49a

- Endian support has been added.

  Refer to svt_ahb_system_configuration::little_endian in AHB Class Reference Manual.
- Bug fixes

4.6.159 Notes for Release 1.48a

- Support for AHB Bus VIP
  - Currently supported on UVM and OVM flows, on VCS only.
  - Support for arbiter, decoder, Write data multiplexer, Read data/response multiplexer, Control signals multiplexer, Dummy master and Default slave.
  - Support for round robin arbitration algorithm.
  - Support for OKAY, ERROR and RETRY responses.
  - AHB Bus VIP does not yet support SPLIT response, generating Early Burst Termination (EBT), Locked transfers.
- Ability in master and slave to continue on ERROR response. Refer to svt_ahb_system_configuration::error_response_policy in AHB Class Reference Manual.
- AHB SVT Interface svt_ahb_if has a non-backwards compatible change. Refer to section "Backwards compatibility" in AHB User Guide for details.

4.6.160 Notes for Release 1.47a

- Bug fixes

4.6.161 Notes for Release 1.46a

- The following Beat level Callbacks have been added in this release:
  - svt_ahb_master_monitor_callback::beat_started
  - svt_ahb_master_monitor_callback::beat_ended
  - svt_ahb_slave_monitor_callback::beat_started
  - svt_ahb_slave_monitor_callback::beat_ended

  Refer to the AHB Class Reference Manual for more details.
- MTI support for AHB components in UVM flow
- Bug fixes

4.6.162 Notes for Release 1.40a

There are no new features for this release.

4.6.163 Notes for Release 1.37a

- Support for AHB sideband signals has been added. The sideband signals have same timing as AHB control signals. Following members have been added to support this feature:
  - svt_ahb_configuration::control_huser_enable
  - svt_ahb_configuration::control_huser_width
  - svt_ahb_transaction::control_huser
  - New signal control_huser has been added to the AHB Interface

4.6.164 Notes for Release 1.36a

- Note that this release deprecates following callbacks:
  - svt_ahb_master_callback::address_phase_started
  - svt_ahb_master_callback::data_phase_started
  - svt_ahb_slave_callback::address_phase_started
  - svt_ahb_slave_callback::data_phase_started
  - svt_ahb_master_monitor_callback::address_phase_started
  - svt_ahb_master_monitor_callback::data_phase_started
  - svt_ahb_slave_monitor_callback::address_phase_started
  - svt_ahb_slave_monitor_callback::data_phase_started
- Bug fixes and updates

4.6.165 Notes for Release 1.35a

There are no new features for this release.

4.6.166 Notes for Release 1.34a

- Support for hready input in AHB Slave VIP
- Support for AHB Bind interface for master and slave. The bind interface contains directional signals. Users can optionally connect the DUT signals to VIP through this bind interface. Refer to AHB User Guide for more details.

4.6.167 Notes for Release 1.33a

There are no new features for this release.

4.6.168 Notes for Release 1.32a

Components:

- AHB System Monitor added in this release

Methodology features:

- AHB components are supported in OVM methodology

Protocol features:

- Support for full AHB protocol
- Support in Master for generation of bus request, and transmission of transaction on receiving grant
- Split/Retry support in Master & Slave
- Support in Master for rebuilding transaction when it receives Early Burst Termination (EBT) from arbiter

Flow:

- Support for IUS simulator

Examples:

- AHB OVM Basic example

4.6.169 Notes for Release 1.31a

There are no new features for this release.

4.6.170 Notes for Release 1.30a

- Ability for user to avoid loading the UVM and OVM package through VIP package. To avoid loading UVM or OVM package through VIP package, user needs to define the macro SVT_EXCLUDE_METHODOLOGY_PKG.

4.6.171 Notes for Release 1.29a

There are no new features for this release.

4.6.172 Notes for Release 1.28a

There are no new features for this release.

4.6.173 Notes for Release 1.27a

There are no new features for this release.

4.6.174 Notes for Release 1.26a

There are no new features for this release.

4.6.175 Notes for Release 1.20a

There are no new features for this release.

4.6.176 Notes for Release 1.12a

There are no new features for this release.

4.6.177 Notes for Release 1.11a

Components:

- AHB Master agent (active mode), AHB Slave agent (active mode), AHB System ENV

Methodology features:

- AHB components are supported in UVM methodology

Protocol features:

- Support for AHB-Lite protocol

Verification features:

- AHB-Lite protocol checks
- Debug port for AHB components

Features not yet supported in AHB components:

- Full AHB protocol is not yet supported. Only AHB-Lite is supported.
- Passive mode for AHB Master and Slave agent is not yet supported. That is, the Master and Slave agents can only function in active mode currently. The functionality of protocol checking and providing completed transaction object from analysis port will be performed in active mode only. Once the passive mode is supported, this functionality will also be performed in passive mode.
- Coverage is not yet supported.

4.6.178 Notes for Release 1.10a

There are no new features for this release.

4.6.179 Notes for Release 1.09a

There are no new features for this release.

4.6.180 Notes for Release 1.08a

There are no new features for this release.

4.6.181 Notes for Release 1.07a

There are no new features for this release.

4.6.182 Notes for Release 1.06a

There are no new features for this release.

4.6.183 Notes for Release 1.00a

- The 1.00a has a documentation update. Consult the section "Downloading Installation Run Files" for a listing of changes to all VIP models.

5 APB Verification IP Notes

These release notes describe the changes for S-2021.06 version of the VC Verification IP for AMBA APB.

5.1 Introduction

The APB VIP supports verification of SoC designs that include interfaces implementing the APB Specification.

The APB Verification IP supports the following methodologies:

- UVM
- OVM

The APB VIP supports the following protocols:

- APB2
- APB3
- APB4

5.2 Supported Methodology, OS, and Simulator Versions

This version of APB VIP is qualified with version R-2020.12 of SystemVerilog Verification Technology (SVT). SVT is an internal portion of the VIP and provides base VIP functionality, some utilities, and support for installation and licensing.

This version supports SVT R-2020.12 and later. The version of SVT is the key for determining which versions of platform/OS and simulators have been qualified with this VIP. Whenever a new version of SVT is released, this VIP is qualified with it.

To determine the version of SVT in an existing DESIGNWARE_HOME installation, use:

```
$DESIGNWARE_HOME/bin/dw_vip_setup -i home
```

Xcelium Simulator 19.09.004 is not supported in AMBA VIP release Q-2020.03.

Note To avoid ICDPAV (Illegal Combination of Driver and Procedural Assignment to Variable) error/warning from IUS simulator, use the Bind interface provided with the VIP. Refer to tb_axi_svt_uvm_intermediate_sys example for usage of bind interface.

This table lists the supported methodology versions.

Table 5-7 Supported Methodology Versions

Methodology	Supported Version	Unsupported Version
OVM	2.1.2	2.1.1_3
UVM	1.1d, 1.2, 1800.2-2017-1.0, 1800.2-2017-1.1	1.1a

5.2.1 Supported Simulator Platforms

The simulator matrix table is available at the following location:

VC VIP Library page
https://spdocs.synopsys.com/dow_retrieve/latest/vg/snps_vip_lib/PDFs/simulator_matrix.pdf

For more information on the simulator matrix and library level updates, see VC VIP Library Release Notes.

Table 5-8 shows the list of methodologies supported with the simulators.

Table 5-8 Supported Methodologies with Simulators

Methodology	VCS	Xcelium	Questasim
UVM 1.1d, 1.2	Supported	Supported	Supported
UVM 1800.2-2017-1.0, 1800.2-2017-1.1	Supported	Not yet supported	Not yet supported
OVM	Supported	Not yet supported	Supported

5.3 Known Issues and Limitations

- Compilation failure may occur for the following combination of methodology, simulator and platform:

  UVM, IUS (irun flow), Suse 10.0/11.0.

- The following examples are not supported on IUS simulator:
  - `tb_apb_svt_uvm_basic_active_passive_sys`
  - `tb_apb_svt_uvm_basic_program_sys`

Note If you observe a compilation failure with this combination, add `-gcc_vers 4.1` to the irun command line.

- The following verification features are not supported in the Env model:
  - Support for Verification Planner

- Debug port
- Exceptions (error injection)
- Sequence coverage

- AMBA VIP does not support MTI 10.3 version.
- Class reference HTML has a known issue in release J-2014.12-SP2-1. The argument names of public methods are not displayed correctly. The argument names appear as the method name.
- `tb_apb_svt_uvm_basic_active_passive_sys` is not supported for IUS simulator.
- IEEE Encryption and Incdir flow is supported in VCS and MTI simulators only. For more details, see the sections 2.6 and 2.7 in the VC VIP Library Installation Guide.
- Euclide lint check errors are expected in UVM 1.2 with `UVM_NO_DEPRECATED` macro.
- Euclide lint check is not supported with IEEE 1800.2 UVM.
- Supported with VCS versions 2020.12-SP1 or later.
- Compatible with UVM Version 1.1d.

5.4 Documentation

After the VIP is downloaded and installed, product documentation resides at:

```
$DESIGNWARE_HOME/vip/AMBA SVT/latest/doc/
```

The documentation consists of the following:

- APB UVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/apb_svt_uvm_user_guide.pdf`
- APB UVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/apb_svt_uvm_class_reference/html/index.html`
- APB OVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/apb_svt_ovm_user_guide.pdf`
- APB OVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/apb_svt_ovm_class_reference/html/index.html`
- Verification Plans: Pointer to directory with README and *.xml files:

  ```
  $DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/VerificationPlans/README
  $DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/VerificationPlans/*.xml
  ```

For Test Suite, contact Synopsys.

Attention

Beginning in December 2014 with the J-2014.12 release, Synopsys Verification IP products adopt the release version format recommended by the company. The new version format is:

<alphabet>-<year>.<month>

<alphabet> is a single letter corresponding to the QSC foundation that the release is compliant with.
<year> is a 4-digit number corresponding to the year of the release.
<month> is a 2-digit number corresponding to the month of the release.

For patch releases, a "-<patch_number>" is appended to the release version.
For Service Pack releases, a "-SP<number>" is appended to the release version.

For example:

J-2014.12	Release in December 2014 that is compliant with the J foundation
J-2014.12-1	First patch on the J-2014.12 release
J-2014.12-SP1	First Service Pack release for J-2014.12

Note Version 2.93a was the last release before the version change.

5.5 Notes for Release S-2021.06

- Updated the VIP version as S-2021.06.
- VIP is compatible with VCS +lint= LRM_1800_2009 option.

5.6 Notes for Previous Releases

5.6.1 Notes for Release R-2021.03-2

- Updated VIP version as R-2021.03-2.
- This is the change in behavior for the configuration of `svt_apb_system_configuration::protocol_checks_enable`:
  - **Previous behavior**: It controls disabling and enabling of protocol checks for master and all the slaves that are part of that system. `svt_apb_slave_confiuration::protocol_checks_enable` has no significance, but `svt_apb_slave_configuration::protocol_checks_coverage_enable` has still relevance.
  - **New behavior**: Starting with the R-2021.03-2 release, `svt_apb_system_configuration::protocol_checks_enable` controls disabling and enabling of protocol checks for master, but not the slaves that are part of the same system. `svt_apb_slave_configuration::protocol_checks_enable` controls the protocol checks enabling and disabling for a given slave agent.

5.6.1.1 Enhancements/E-STARs

E-STAR	Description
None	-

5.6.1.2 Bug Fixes/B-STARs

B-STAR	Description
3633094	svt_apb_slave_configuration::protocol_checks_enable is not working as expected

5.6.2 Notes for Release R-2021.03-1

- Updated VIP version as R-2021.03-1.

5.6.2.1 Enhancements/E-STARs

E-STAR	Description
3565171	APB trace file enhancements to remove reporter name, add PSLVERR

5.6.2.2 Bug Fixes/B-STARs

B-STAR	Description
9001275163	Incorrect macro description in apb user guide

5.6.3 Notes for Release R-2021.03

- Updated VIP version as R-2021.03.
- Added support for Euclide (Eclipse based IDE) for lint rule checking. The VIP works seamlessly with Euclide IDE when configured with testbench rule setting and would not result in any fatal errors.
  - UVM 1.2 is supported without `UVM_NO_DEPRECATED` macro.

5.6.4 Notes for Release R-2020.12-3

- Updated VIP version as R-2020.12-3.

5.6.4.1 Enhancements/E-STARs

E-STAR	Description
N.A	-

5.6.4.2 Bug Fixes/B-STARs

B-STAR	Description
N.A	-

5.6.5 Notes for Release R-2020.12

- Updated VIP version as R-2020.12.

5.6.5.1 Enhancements/E-STARs

E-STAR	Description
N.A	-

5.6.5.2 Bug Fixes/B-STARs

B-STAR	Description
N.A	-

5.6.6 Notes for Release R-2020.09-3

- Updated VIP version as R-2020.09-3.

5.6.6.1 Enhancements/E-STARs

E-STAR	Description
N.A	-

5.6.6.2 Bug Fixes/B-STARs

B-STAR	Description
N.A	-

5.6.7 Notes for Release R-2020.09-2

- Updated VIP version as R-2020.09-2.

5.6.7.1 Enhancements/E-STARs

E-STAR	Description
N.A	-

5.6.7.2 Bug Fixes/B-STARs

B-STAR	Description
N.A	-

5.6.8 Notes for Release Q-2020.06-3

- Updated VIP version as Q-2020.06-3.

5.6.8.1 Enhancements/E-STARs

E-STAR	Description
N.A	-

5.6.8.2 Bug Fixes/B-STARs

B-STAR	Description
N.A	-

5.6.9 Notes for Release Q-2020.06-2

- Updated VIP version as Q-2020.06-2.

5.6.9.1 Enhancements/E-STARs

E-STAR	Description
N.A	-

5.6.9.2 Bug Fixes/B-STARs

B-STAR	Description
N.A	-

5.6.10 Notes for Release Q-2020.06-1

- Updated VIP version as Q-2020.06-1.

5.6.10.1 Enhancements/E-STARs

E-STAR	Description
N.A	-

5.6.10.2 Bug Fixes/B-STARs

B-STAR	Description
9001481609	To check the status of PSLVERR only when PREADY is high.

5.6.11 Notes for Release Q-2020.06

- Updated VIP version as Q-2020.06.

5.6.12 Notes for Release Q-2020.03-3

- Updated VIP version as Q-2020.03-3.

5.6.13 Notes for Release Q-2020.03

- Updated VIP version as Q-2020.03

5.6.14 Notes for Release Q-2019.12

- Added port configuration for silent mode. In this mode, no messages are printed from APB VIP.

5.6.15 Notes for Release P-2019.09

- Support for all address widths between 1 to 32 bits. Earlier, address width of only 32 bits and 64 bits was supported.
- Support for IEEE 1800.2 UVM version.

5.6.16 Notes for Release P-2019.06

- Updated VIP version as P-2019.06.

5.6.17 Notes for Release P-2019.03

- Updated VIP version as P-2019.03.
- Support for APB Trace file generation.

5.6.18 Notes for Release O-2018.12

- Updated VIP version as O-2018.12.
- Added support for incdir flow.

5.6.19 Notes for Release O-2018.09

- Updated VIP and SVT version as O-2018.09.

5.6.20 Notes for Release O-2018.06-3

There are no new features for this release.

5.6.21 Notes for Release O-2018.06

There are no new features for this release.

5.6.22 Notes for Release N-2018.03-1

There are no new features for this release.

5.6.23 Notes for Release N-2018.03

There are no new features for this release.

5.6.24 Notes for Release N-2017.12-1

There are no new features for this release.

5.6.25 Notes for Release N-2017.12-T-20171124

There are no new features for this release.

5.6.26 Notes for Release N-2017.12

The following are the updates for this release:

- VIP version updated as N-2017.12.
- SVT version updated as N-2017.12.

- Added support for VC AutoTestbench tool. See APB VIP User Guide for more information.

5.6.27 Notes for Release N-2017.09-3

- Added configuration member `svt_apb_slave_configuration::memory_update_for_read_xact_enable`.
  For more details, see APB Class Reference HTML.

5.6.28 Notes for Release N-2017.09-2

- Added Master to slave region transaction cross coverage in APB VIP.

5.6.29 Notes for Release N-2017.09-1

There are no new features for this release.

5.6.30 Notes for Release N-2017.09

There are no new features for this release.

5.6.31 Notes for Release M-2017.06-3

There are no new features for this release.

5.6.32 Notes for Release M-2017.06-2

The following is the update for this release:

- Removed the APB protocol check `prdata_changed_during_transfer`. The PRDATA cannot change during the access phase, which only exists for one clock cycle.
- APB callback `svt_apb_slave_monitor_callback::access_phase()` will be called only when the access phase ends. Earlier, it was called for every clock, while PREADY was low during the access phase.
- Renamed the configuration variable from `xml_gen_enable` to `enable_xml_gen`.

5.6.33 Notes for Release M-2017.06

Added configuration member `svt_apb_configuration::data_idle_value` to control values driven on PRDATA and PWDATA bus during idle period.

5.6.34 Notes for Release M-2017.03-2

There are no new features for this release.

5.6.35 Notes for Release M-2017.03

There are no new features for this release.

5.6.36 Notes for Release M-2016.12-2

There are no new features for this release.

5.6.37 Notes for Release M-2016.12

There are no new features for this release.

5.6.38 Notes for Release L-2016.09-3

There are no new features for this release.

5.6.39 Notes for Release L-2016.09-2

There are no new features for this release.

5.6.40 Notes for Release L-2016.09

There are no new features for this release.

5.6.41 Notes for Release L-2016.06-3

There are no new features for this release.

5.6.42 Notes for Release L-2016.06-2

There are no new features for this release.

5.6.43 Notes for Release L-2016.06-1

- Added the following methods to support adding of external APB master and slave agents in to the APB system environment.
  - svt_apb_master_agent::set_external_agents_props in APB master class which allows to set the port id and port configuration of the external master. (setting up of port id is not supported for external master).
  - svt_apb_system_env::set_external_master_agent
  - svt_apb_slave_agent::set_external_agents_props in APB slave agent class which is used to set the port id and port configuration of the external master.
  - svt_apb_system_env::set_external_slave_agent

5.6.44 Notes for Release L-2016.06

There are no new features for this release.

5.6.45 Notes for Release L-2016.03-3

There are no new features for this release.

5.6.46 Notes for Release L-2016.03-2

The following new feature is added for the release:

- Support for asynchronous reset detection

5.6.47 Notes for Release L-2016.03-1

There are no new features for this release.

5.6.48 Notes for Release L-2016.03

There are no new features for this release.

5.6.49 Notes for Release K-2015.12-2

There are no new features for this release

5.6.50 Notes for Release K-2015.12-1

There are no new features for this release

5.6.51 Notes for Release K-2015.12

The following new features are added in this release:

- Support for user signals in APB VIP.
  - Signal control_puser added to APB interface
  - Added members svt_apb_transaction::control_puser and svt_apb_configuration::control_puser_enable
- Added members svt_apb_system_configuration::disable_x_check_of_presetn and svt_apb_system_configuration::disable_x_check_of_pclk to disable X checks on reset and clock signals.

  Refer to APB Class Reference documentation for more details.

5.6.52 Notes for Release K-2015.09-2

There are no new features for this release.

5.6.53 Notes for Release K-2015.09-1-T0922

The following new feature for this release:

New system configuration parameters added for APB for STAR 9000938943

- disable_x_check_of_reset
- disable_x_check_of_pclk

5.6.54 Notes for Release K-2015.09-1

There are no new features for this release.

5.6.55 Notes for Release K-2015.09

The following new features are added in this release:

- Support for native dumping of FSDB. Refer to member `svt_apb_configuration::pa_format_type` in Class Reference HTML.

5.6.56 Notes for Release K-2015.09-Beta

There are no new features for this release.

5.6.57 Notes for Release J-2014.12-SP2-1

The following change has been made in this release:

- Support for output signals to be initialized to '0' at time 0 is added. The configuration parameter svt_apb_configuration::initialize_output_signals_at_start has been added.

5.6.58 Notes for Release J-2014.12-SP2

There are no new features for this release.

5.6.59 Notes for Release J-2014.12-SP1-3-T0507

The following changes have been made in this release:

- Added support for `is_active` variable in APB interface.
- The following APB covergroups have been added:
  - trans_x_on_prdata_when_pslverr_1_read_xact
  - trans_apb_state_after_reset_deasserted
  - toggle_coverage_presetn
  - transition_of_psel_enable_and_pready
  - trans_pslverr_signal_transition
  - trans_four_state_rd_wr_sequence
  - trans_four_state_err_resp_sequence
  - trans_pstrb_addr_aligned_unaligned16
  - trans_pstrb_addr_aligned_unaligned32
  - trans_pstrb_addr_aligned_unaligned64

5.6.60 Notes for Release J-2014.12-SP1-3-T0430

The following protocol checks have been added:

- Added check to detect X in present and pclk signal in `apb_if` interface.
- STAR fixes

5.6.61 Notes for Release J-2014.12-SP1-3

The following protocol checks have been added:

- control_signals_changed_during_idle_check
- initial_bus_state_after_reset
- pready_timeout_check
- pstrb_low_for_read

5.6.62 Notes for Release J-2014.12-SP1-2

The following protocol checks have been added:

- control_signals_changed_during_idle_check

- initial_bus_state_after_reset
- pready_timeout_check
- pstrb_low_for_read

5.6.63 Notes for Release J-2014.12-SP1-1

There are no new features for this release.

5.6.64 Notes for Release J-2014.12-SP1

The following changes have been made in this release:

- Names of Verification Plans have been updated for consistency across VIP titles.
- Session file `waves.rc` file for Verdi provided in example installation.
- Support for Debug Automation added. Refer to APB User Guide for more details.
- `-doc` option added to `dw_vip_setup` script. Refer to APB User Guide for more details.

Note

Pre J-2014.12-SP1 AMBA VIP test benches will have compilation errors if other J-2014.12-SP1 VIPs are installed. The compilation error is as follows:

```
Error-[MFNF] Member not found
/DESIGNWARE_HOME/vip/svt/amba_svt/J-
2014.12/ahb_master_agent_svt/sverilog/src/vcs/svt_ahb_tlm_gp_sequence_collection.
svp, 59
"this.req."
  Could not find member 'priority_start' in class 'uvm_tlm_generic_payload',
  at
  "../...../uvm1.1/tlm2/uvm_tlm2_generic_payload.svh"
```

To avoid compilation errors,

- update to J-2014.12-SP1 AMBA VIP

  or

- add `SVT_UVM_UTIL_DISABLE_SEQ_MACRO_ACCEL` on the simulator compile command line to run in backward compatible mode. However, this macro excludes a compilation performance improvement change.

5.6.65 Notes for Release J-2014.12-2-T0116

There are no new features for this release.

5.6.66 Notes for Release J-2014.12-T0107

There are no new features for this release.

5.6.67 Notes for Release J-2014.12-T1219

There are no new features for this release.

5.6.68 Notes for Release J-2014.12-1

There are no new features for this release.

5.6.69 Notes for Release J-2014.12

The following changes have been made in this release:

- Provided examples for dumping FSDB files for viewing waveform
- The *VC Verification IP AMBA APB UVM Getting Started Guide* is newly provided from this release onwards. It presents information about integrating the VC VIP for APB (referred to as VIP) into testbenches that are compliant with the SystemVerilog Universal Verification Methodology (UVM).

5.6.70 Notes for Release 2.93a

STAR fixes only.

5.6.71 Notes for Release 2.92a

There are no new features for this release.

5.6.72 Notes for Release 2.91a

The following changes have been made in this release:

- Added support for UVM 1.2.
- Added a basic UVM example called `tb_apb_svt_uvm_basic_program_sys`.
  This example demonstrates the usage of program block. It is supported only on the VCS simulator.

5.6.73 Notes for Release 2.90a

There are no new features for this release.

5.6.74 Notes for Release 2.89a

There are no new features for this release.

5.6.75 Notes for Release 2.88a

There are no new features for this release.

5.6.76 Notes for Release 2.87a

There are no new features for this release.

5.6.77 Notes for Release 2.86a

There are no new features for this release.

5.6.78 Notes for Release 2.85a

There are no new features for this release.

5.6.79 Notes for Release 2.80b

There are no new features for this release.

5.6.80 Notes for Release 2.82a

Support added for 64 bit Address and Data in APB VIP

- Added following user defines for this support:

  `SVT_APB_MAX_ADDR_WIDTH` - This macro defines Max address width for PADDR signal. The default value is 32. This macro needs to be defined as part of `svt_apb_user_defines.svi` file.

  `SVT_APB_MAX_DATA_WIDTH` - This macro defines Max data width for PWDATA and PRDATA signals. The default value is 8. This macro needs to be defined as part of `svt_apb_user_defines.svi` file

- Added the following enums in `svt_apb_system_configuration:`

```
svt_apb_system_configuration::paddr_width_enum
          PADDR_WIDTH_64(64)
svt_apb_system_configuration::pdata_width_enum
          PDATA_WIDTH_64(64)
```

Note

The existing user defines `SVT_APB_PADDR_WIDTH, SVT_APB_PWDATA_WIDTH` and `SVT_APB_PRDATA_WIDTH` will be deprecated in future release.

5.6.81 Notes for Release 2.81a

There are no new features for this release.

5.6.82 Notes for Release 2.80a

There are no new features for this release.

5.6.83 Notes for Release 2.75a

- Support added for Verification Plans in `.hvp` format, in addition to the `.xml` format which is already being shipped
- STAR fixes

5.6.84 Notes for Release 2.73a

There are no new features for this release.

5.6.85 Notes for Release 2.72a

There are no new features for this release.

5.6.86 Notes for Release 2.71a

There are no new features for this release.

5.6.87 Notes for Release 2.70a

There are no new features for this release.

5.6.88 Notes for Release 2.65a

There are no new features for this release.

5.6.89 Notes for Release 2.62a

There are no new features for this release.

5.6.90 Notes for Release 2.60a

There are no new features for this release.

5.6.91 Notes for Release 2.59a

There are no new features for this release.

5.6.92 Notes for Release 2.57a

There are no new features for this release.

5.6.93 Notes for Release 2.56a

There are no new features for this release.

5.6.94 Notes for Release 2.55a

Protocol check coverage support has been added.

The following variable is added to support this feature:

```
svt_apb_configuration::protocol_checks_coverage_enable
```

5.6.95 Notes for Release 2.54a

There are no new features for this release.

5.6.96 Notes for Release 2.53a

There are no new features for this release.

5.6.97 Notes for Release 2.52a

There are no new features for this release.

5.6.98 Notes for Release 2.51a

There are no new features for this release.

5.6.99 Notes for Release 2.50a

There are no new features for this release.

5.6.100 Notes for Release 2.48a

There are no new features for this release.

5.6.101 Notes for Release 2.47a

There are no new features for this release.

5.6.102 Notes for Release 2.45a

There are no new features for this release.

5.6.103 Notes for Release 2.44a

There are no new features for this release.

5.6.104 Notes for Release 2.43a

There are no new features for this release.

5.6.105 Notes for Release 2.42a

There are no new features for this release.

5.6.106 Notes for Release 2.41a

There are no new features for this release.

5.6.107 Notes for Release 2.40a

There are no new features for this release.

5.6.108 Notes for Release 2.39a

There are no new features for this release.

5.6.109 Notes for Release 2.38a

New license features VIP-AMBA3-SVT and VIP-AMBA4-OPT-SVT have been added.

5.6.110 Notes for Release 2.37a

There are no new features for this release.

5.6.111 Notes for Release 2.36a

There are no new features for this release.

5.6.112 Notes for Release 2.35a

There are no new features for this release.

5.6.113 Notes for Release 2.30a

There are no new features for this release.

5.6.114 Notes for Release 2.29a

There are no new features for this release.

5.6.115 Notes for Release 2.28a

Maximum 128 APB Systems are supported in AMBA System Env.

5.6.116 Notes for Release 2.27a

There are no new features for this release.

5.6.117 Notes for Release 2.26a

- STAR fixes

5.6.118 Notes for Release 2.25a

There are no new features for this release.

5.6.119 Notes for Release 2.20a

There are no new features for this release.

5.6.120 Notes for Release 2.16a

There are no new features for this release.

5.6.121 Notes for Release 2.15a

There are no new features for this release.

5.6.122 Notes for Release 2.14a

There are no new features for this release.

5.6.123 Notes for Release 2.13a

There are no new features for this release.

5.6.124 Notes for Release 2.12a

There are no new features for this release.

5.6.125 Notes for Release 2.11a

There are no new features for this release.

5.6.126 Notes for Release 2.10a

There are no new features for this release.

5.6.127 Notes for Release 2.05a

There are no new features for this release.

5.6.128 Notes for Release 2.03a

There are no new features for this release.

5.6.129 Notes for Release 2.02a

There are no new features for this release.

5.6.130 Notes for Release 2.01a

There are no new features for this release.

5.6.131 Notes for Release 2.00a

There are no new features for this release.

5.6.132 Notes for Release 1.99a

There are no new features for this release.

5.6.133 Notes for Release 1.98a

There are no new features for this release.

5.6.134 Notes for Release 1.97a

There are no new features for this release.

5.6.135 Notes for Release 1.96a

There are no new features for this release.

5.6.136 Notes for Release 1.95a

There are no new features for this release.

5.6.137 Notes for Release 1.90a

- Support for APB Verification Plans has been added.

5.6.138 Notes for Release 1.81a

There are no new features for this release.

5.6.139 Notes for Release 1.80a

- Support for 128 Slaves has been added in APB System Env. Previously, APB System Env supported up to 16 slaves.

5.6.140 Notes for Release 1.79a

There are no new features for this release.

5.6.141 Notes for Release 1.78a

There are no new features for this release.

5.6.142 Notes for Release 1.77a

There are no new features for this release.

5.6.143 Notes for Release 1.76a

- STAR fixes

5.6.144 Notes for Release 1.75a

There are no new features for this release.

5.6.145 Notes for Release 1.70a

There are no new features for this release.

5.6.146 Notes for Release 1.66a

There are no new features for this release.

5.6.147 Notes for Release 1.65a

There are no new features for this release.

5.6.148 Notes for Release 1.64a

- Bug Fixes

5.6.149 Notes for Release 1.63a

There are no new features for this release.

5.6.150 Notes for Release 1.62a

There are no new features for this release.

5.6.151 Notes for Release 1.61a

- Manual triggering for transaction start, accept and end event have been added to APB master and slave VIP.
- Bug Fixes

5.6.152 Notes for Release 1.60a

- Bug Fixes

5.6.153 Notes for Release 1.55a

- Bug Fixes

5.6.154 Notes for Release 1.50a

- Bug Fixes

5.6.155 Notes for Release 1.50a

- Support for compilation with Verdi3_2012.04 has been added.

5.6.156 Notes for Release 1.49a

There are no new features for this release.

5.6.157 Notes for Release 1.48a

There are no new features for this release.

5.6.158 Notes for Release 1.47a

- Bug Fixes

5.6.159 Notes for Release 1.46a

There are no new features for this release.

5.6.160 Notes for Release 1.40a

There are no new features for this release.

5.6.161 Notes for Release 1.37a

There are no new features for this release.

5.6.162 Notes for Release 1.36a

- Bug Fixes

5.6.163 Notes for Release 1.35a

There are no new features for this release.

5.6.164 Notes for Release 1.34a

- Bug Fixes

5.6.165 Notes for Release 1.33a

There are no new features for this release.

5.6.166 Notes for Release 1.32a

There are no new features for this release.

5.6.167 Notes for Release 1.31a

- Fix for APB Master issue that PENABLE only asserted when PREADY is low.

5.6.168 Notes for Release 1.30a

- Ability for user to avoid loading the UVM and OVM package through VIP package. To avoid loading UVM or OVM package through VIP package, user needs to define the macro SVT_EXCLUDE_METHODOLOGY_PKG.

5.6.169 Notes for Release 1.29a

- Qualified with OVM 2.1.1

5.6.170 Notes for Release 1.28a

There are no new features for this release.

5.6.171 Notes for Release 1.27a

- Added new members svt_apb_slave_configuration::slave_xact_inactivity_timeout and svt_apb_system_configuration::master_xact_inactivity_timeout to support timeout feature in APB SVT.

  Refer to APB Class reference manual for more details.

5.6.172 Notes for Release 1.26a

There are no new features for this release.

5.6.173 Notes for Release 1.20a

There are no new features for this release.

5.6.174 Notes for Release 1.12a

There are no new features for this release.

5.6.175 Notes for Release 1.11a

Verification features:

- Protocol Analyzer support for APB

5.6.176 Notes for Release 1.10a

- Additional protocol checks in APB

5.6.177 Notes for Release 1.09a

Methodology features:

- Support for APB components in OVM methodology

5.6.178 Notes for Release 1.08a

There are no new features for this release.

5.6.179 Notes for Release 1.07a

There are no new features for this release.

5.6.180 Notes for Release 1.06a

There are no new features for this release.

5.6.181 Notes for Release 1.00a

- The 1.00a has a documentation update. Consult the section "Downloading Installation Run Files" for a listing of changes to all VIP models.

5.6.182 Notes for Release 0.60a

Components:

- APB System Env, APB Master agent, APB Slave agent support

Methodology features:

- APB components are supported in UVM methodology

Protocol features:

- Support for APB2/3/4 protocol

Verification features:

- Support for APB built-in sequences, coverage and protocol checks

5.6.183 Notes for Release 0.59a

There are no new features for this release.

5.6.184 Notes for Release 0.58a

There are no new features for this release.

5.6.185 Notes for Release 0.57a

There are no new features for this release.

5.6.186 Notes for Release 0.56a

There are no new features for this release.

5.6.187 Notes for Release 0.55a

There are no new features for this release.

5.6.188 Notes for Release 0.54a

There are no new features for this release.

5.6.189 Notes for Release 0.53a

There are no new features for this release.

5.6.190 Notes for Release 0.52a

There are no new features for this release.

5.6.191 Notes for Release 0.51a

There are no new features for this release.

5.6.192 Notes for Release 0.50a

There are no new features for this release.

5.6.193 Notes for Release 0.49a

There are no new features for this release.

5.6.194 Notes for Release 0.48a

There are no new features for this release.

5.6.195 Notes for Release 0.47a

There are no new features for this release.

5.6.196 Notes for Release 0.46a

There are no new features for this release.

5.6.197 Notes for Release 0.45a

There are no new features for this release.

5.6.198 Notes for Release 0.40a

There are no new features for this release.

5.6.199 Notes for Release 0.33a

Protocol features: ACE Snoop filtering, ACE speculative read

5.6.200 Notes for Release 0.32a

Examples: Updates to ACE example to demonstrate ACE Barrier, ACE DVM features

5.6.201 Notes for Release 0.31a

Verification features: Performance improvements during constraint solving.

6 ATB Verification IP Notes

These release notes describe the changes for S-2021.06 Version of the VC Verification IP for AMBA ATB.

6.1 Introduction

The ATB VIP supports verification of SoC designs that include interfaces implementing the ATB Specification.

The ATB Verification IP supports the following methodologies:

- UVM

6.2 Supported Methodology, OS, and Simulator Versions

This version of ATB VIP is qualified with version R-2020.12 of SystemVerilog Verification Technology (SVT). SVT is an internal portion of the VIP and provides base VIP functionality, some utilities, and support for installation and licensing.

This version supports SVT R-2020.12 and later. The version of SVT is the key for determining which versions of platform/OS and simulators have been qualified with this VIP. Whenever a new version of SVT is released, this VIP is qualified with it.

To determine the version of SVT in an existing DESIGNWARE_HOME installation, use:

```
$DESIGNWARE_HOME/bin/dw_vip_setup -i home
```

Xcelium Simulator 19.09.004 is not supported in AMBA VIP release Q-2020.03.

To avoid ICDPAV (Illegal Combination of Driver and Procedural Assignment to Variable) error/warning from IUS simulator, use the Bind interface provided with the VIP. Refer to tb_axi_svt_uvm_intermediate_sys example for usage of bind interface.

This table lists the supported methodology versions.

Table 6-9 Supported Methodology Versions

Methodology	Supported Version	Unsupported Version
UVM	1.1d, 1.2	1.1a, 1800.2-2017-1.0, 1800.2-2017-1.1

6.2.1 Supported Simulator Platforms

The simulator matrix table is available at the following location:

VC VIP Library page
https://spdocs.synopsys.com/dow_retrieve/latest/vg/snps_vip_lib/PDFs/simulator_matrix.pdf

For more information on the simulator matrix and library level updates, see VC VIP Library Release Notes.

Table 6-10 shows the list of methodologies supported with the simulators.

Table 6-10 Supported Methodologies with Simulators

Methodology	VCS	Xcelium	Questasim
UVM 1.1d, 1.2	Supported	Supported	Supported

6.3 Known Issues and Limitations

- Class reference HTML has a known issue in release J-2014.12-SP2-1. The argument names of public methods are not displayed correctly. The argument names appear as the method name.
- IEEE Encryption and Incdir flow is supported in VCS and MTI simulators only. For more details, see the sections 2.6 and 2.7 in the VC VIP Library Installation Guide.
- Euclide lint check errors are expected in UVM 1.2 with `UVM_NO_DEPRECATED` macro.
- Euclide lint check is not supported with IEEE 1800.2 UVM.
- Supported with VCS versions 2020.12-SP1 or later.
- Compatible with UVM Version 1.1d.

6.4 Documentation

After the VIP is downloaded and installed, product documentation resides at:

```
$DESIGNWARE_HOME/vip/AMBA SVT/latest/doc/
```

The documentation consists of the following:

- ATB UVM User Guide, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/atb_svt_uvm_user_guide.pdf`
- ATB UVM class reference HTML, which is installed at:
  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/atb_svt_uvm_class_reference/html/index.html`

For Test Suite, contact Synopsys.

Attention

Beginning in December 2014 with the J-2014.12 release, Synopsys Verification IP products adopt the release version format recommended by the company. The new version format is:

<alphabet>-<year>.<month>

<alphabet> is a single letter corresponding to the QSC foundation that the release is compliant with.
<year> is a 4-digit number corresponding to the year of the release.
<month> is a 2-digit number corresponding to the month of the release.

For patch releases, a "-<patch_number>" is appended to the release version.
For Service Pack releases, a "-SP<number>" is appended to the release version.

For example:

J-2014.12	Release in December 2014 that is compliant with the J foundation
J-2014.12-1	First patch on the J-2014.12 release
J-2014.12-SP1	First Service Pack release for J-2014.12

Note
Version 2.93a was the last release before the version change.

6.5 Notes for Release S-2021.06

- Updated VIP version as S-2021.06.
- VIP is compatible with VCS +lint= LRM_1800_2009 option.

6.6 Notes for Previous Releases

6.6.1 Notes for Release R-2021.03-2

- Updated the VIP version as R-2021.03-2.

6.6.2 Notes for Release R-2021.03-1

- Updated VIP version as R-2021.03-1.

6.6.3 Notes for Release R-2021.03

- Updated VIP version as R-2021.03.
- Added support for Euclide (Eclipse based IDE) for lint rule checking. The VIP works seamlessly with Euclide IDE when configured with testbench rule setting and would not result in any fatal errors.
  - UVM 1.2 is supported without `UVM_NO_DEPRECATED` macro.

6.6.4 Notes for Release R-2020.12-3

- Updated VIP version as R-2020.12-3.

6.6.5 Notes for Release R-2020.12

- Updated VIP version as R-2020.12.

6.6.6 Notes for Release R-2020.09-3

- Updated VIP version as R-2020.09-3.

6.6.7 Notes for Release R-2020.09-2

- Updated VIP version as R-2020.09-2.

6.6.8 Notes for Release R-2020.09

- Updated VIP version as R-2020.09.

6.6.9 Notes for Release Q-2020.06-3

- Updated VIP version as Q-2020.06-3.

6.6.10 Notes for Release Q-2020.06-2

- Updated VIP version as Q-2020.06-2.

6.6.11 Notes for Release Q-2020.06-1

- Updated VIP version as Q-2020.06-1.

6.6.12 Notes for Release Q-2020.06

- Updated VIP version as Q-2020.06.

6.6.13 Notes for Release Q-2020.03-3

- Updated VIP version as Q-2020.03-3.

6.6.14 Notes for Release Q-2020.03

- Updated VIP version as Q-2020.03

6.6.15 Notes for Release Q-2019.12

- Updated VIP version as Q-2019.12.

6.6.16 Notes for Release P-2019.09

- Support for IEEE 1800.2 UVM version.

6.6.17 Notes for Release P-2019.06

- Updated VIP version as P-2019.06.
- There are no new features supported in this release.

6.6.18 Notes for Release P-2019.03

- Updated VIP version as P-2019.03.
- There are no new features supported in this release.

6.6.19 Notes for Release O-2018.12

- Updated VIP version as O-2018.12.
- Added support for incdir flow.

6.6.20 Notes for Release O-2018.09

- Updated VIP and SVT version as O-2018.09.

6.6.21 Notes for Release O-2018.06-3

There are no new features for this release.

6.6.22 Notes for Release O-2018.06

There are no new features for this release.

6.6.23 Notes for Release N-2018.03-1

There are no new features for this release.

6.6.24 Notes for Release N-2018.03

There are no new features for this release.

6.6.25 Notes for Release N-2017.12-1

- Added Verdi Protocol Analyzer and Performance Analyzer support in ATB VIP.

6.6.26 Notes for Release N-2017.12-T-20171124

There are no new features for this release.

6.6.27 Notes for Release N-2017.12

The following are the updates for this release:

- VIP version updated as N-2017.12.
- SVT version updated as N-2017.12.

6.6.28 Notes for Release N-2017.09-3

There are no new features for this release.

6.6.29 Notes for Release N-2017.09-2

There are no new features for this release.

6.6.30 Notes for Release N-2017.09-1

There are no new features for this release.

6.6.31 Notes for Release N-2017.09

There are no new features for this release.

6.6.32 Notes for Release M-2017.06-3

There are no new features for this release.

6.6.33 Notes for Release M-2017.06-2

There are no new features for this release.

6.6.34 Notes for Release M-2017.06-1

There are no new features for this release.

6.6.35 Notes for Release M-2017.06

There are no new features for this release.

6.6.36 Notes for Release M-2017.03-2

There are no new features for this release.

6.6.37 Notes for Release M-2017.03

There are no new features for this release.

6.6.38 Notes for Release M-2016.12-2

There are no new features for this release.

6.6.39 Notes for Release M-2016.12

There are no new features for this release.

6.6.40 Notes for Release L-2016.09-3

There are no new features for this release.

6.6.41 Notes for Release L-2016.09-2

There are no new features for this release.

6.6.42 Notes for Release L-2016.09

There are no new features for this release.

6.6.43 Notes for Release L-2016.06-3

There are no new features for this release.

6.6.44 Notes for Release L-2016.06-2

There are no new features for this release.

6.6.45 Notes for Release L-2016.06-1

There are no new features for this release.

6.6.46 Notes for Release L-2016.06

There are no new features for this release.

6.6.47 Notes for Release L-2016.03-3

There are no new features for this release.

6.6.48 Notes for Release L-2016.03-2

There are no new features for this release.

6.6.49 Notes for Release L-2016.03-1

There are no new features for this release.

6.6.50 Notes for Release L-2016.03

There are no new features for this release.

6.6.51 Notes for Release K-2015.12-2

There are no new features for this release.

6.6.52 Notes for Release K-2015.12-1

There are no new features for this release

6.6.53 Notes for Release K-2015.12

There are no new features for this release.

6.6.54 Notes for Release K-2015.09-2

There are no new features for this release.

6.6.55 Notes for Release K-2015.09-1-T0922

There are no new features for this release.

6.6.56 Notes for Release K-2015.9-1

There are no new features for this release.

6.6.57 Notes for Release K-2015.09

There are no new features for this release.

6.6.58 Notes for Release K-2015.09-Beta

There are no new features for this release.

6.6.59 Notes for Release J-2014.12-SP2-1

There are no new features for this release.

6.6.60 Notes for Release J-2014.12-SP2

There are no new features for this release.

6.6.61 Notes for Release J-2014.12-SP1-3-T0507

There are no new features for this release.

6.6.62 Notes for Release J-2014.12-SP1-3-T0430

There are no new features for this release.

6.6.63 Notes for Release J-2014.12-SP1-3

- Added a compile time macro `SVT_AMBA_DEFAULT_COV_ENABLE` for enabling functional coverage by default

6.6.64 Notes for Release J-2014.12-SP1-2

There are no new features for this release.

6.6.65 Notes for Release J-2014.12-SP1-1

There are no new features for this release.

6.6.66 Notes for Release J-2014.12-SP1

The following changes have been made in this release:

- `-doc` option added to `dw_vip_setup` script. Refer to ATB User Guide for more details.

Note

Pre J-2014.12-SP1 AMBA VIP test benches will have compilation errors if other J-2014.12-SP1 VIPs are installed. The compilation error is as follows:

```
Error-[MFNF] Member not found
/DESIGNWARE_HOME/vip/svt/amba_svt/J-
2014.12/ahb_master_agent_svt/sverilog/src/vcs/svt_ahb_tlm_gp_sequence_collection.
svp, 59
"this.req."
  Could not find member 'priority_start' in class 'uvm_tlm_generic_payload',
  at
  "../...../uvm1.1/tlm2/uvm_tlm2_generic_payload.svh"
```

To avoid compilation errors,

- update to J-2014.12-SP1 AMBA VIP

or

- add `SVT_UVM_UTIL_DISABLE_SEQ_MACRO_ACCEL` on the simulator compile command line to run in backward compatible mode. However, this macro excludes a compilation performance improvement change.

6.6.67 Notes for Release J-2014.12-2-T0116

There are no new features for this release.

6.6.68 Notes for Release J-2014.12-T0107

There are no new features for this release.

6.6.69 Notes for Release J-2014.12-T1219

STAR fixes only.

6.6.70 Notes for Release J-2014.12-1

There are no new features for this release.

6.6.71 Notes for Release J-2014.12

The following changes have been made in this release:

- Added support for UVM 1.2.
- Provided examples for dumping FSDB files for viewing waveform.

6.6.72 Notes for Release 2.93a

STAR fixes only.

6.6.73 Notes for Release 2.92a

There are no new features for this release.

6.6.74 Notes for Release 2.91a

Added a basic UVM example called `tb_atb_svt_uvm_basic_program_sys`.

This example demonstrates the usage of program block. It is supported only on the VCS simulator.

7 CHI Verification IP Notes

7.1 Introduction

The AMBA CHI Verification IP supports verification of SoC designs that include interfaces implementing the CHI specifications.

The CHI Verification IP supports the following methodologies:

- UVM
- VMM

7.2 Downloading Installation Run Files

Follow the instructions below for downloading the software from Synopsys. You can download from the Download Center using either HTTPS or FTP, or with a command-line FTP session. If your Synopsys SolvNet password is unknown or forgotten, go to http://solvnetplus.synopsys.com.

Passive mode FTP is required. The passive command toggles between passive and active mode. If your FTP utility does not support passive mode, use http. For additional information, refer to the following web page:

https://www.synopsys.com/apps/protected/support/EST-FTP_Accelerator_Help_Page.html

Attention The Electronic Software Transfer (EST) system only displays products your site is entitled to download. If the product you are looking for is not available, contact est-ext@synopsys.com.

This section consists of the following subsections:

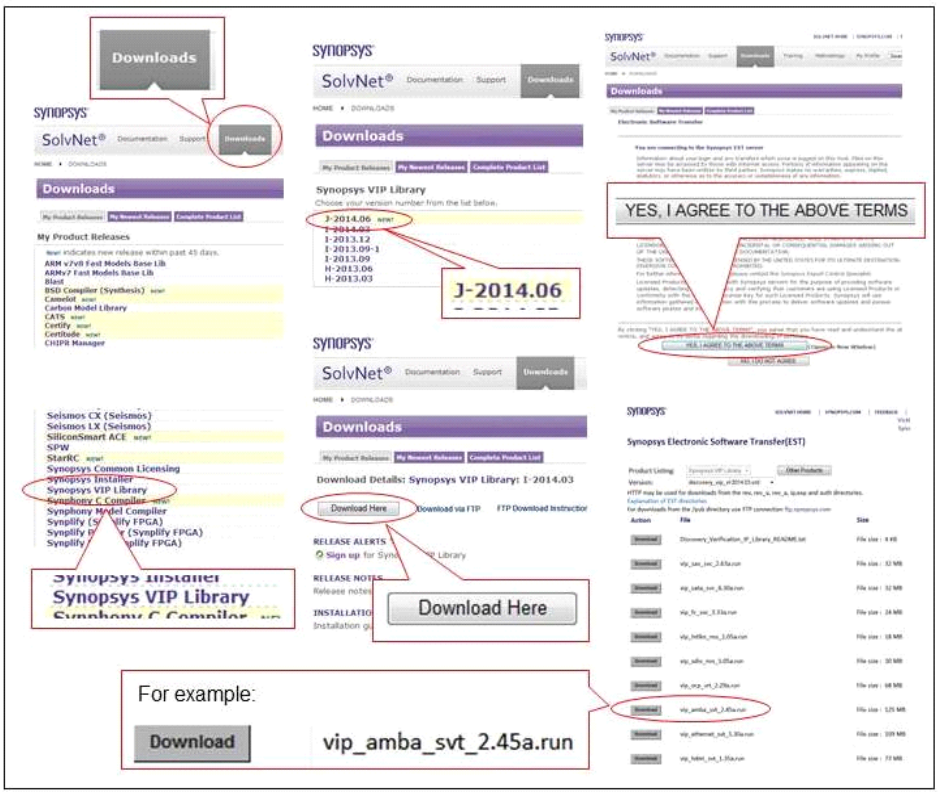
- "Downloading From the Electronic Software Transfer (EST) System (Download Center)" on page 115
- "Downloading Using FTP With a Web Browser" on page 116

7.2.1 Downloading From the Electronic Software Transfer (EST) System (Download Center)

a. Point your web browser to https://solvnetplus.synopsys.com.
b. Enter your Synopsys SolvNetPlus Username and Password.
c. Click the Sign In button.
d. Make the following selections on SolvNet to download the `.run` file of the VIP (See Figure 7-2).

i. Downloads tab
ii. Synopsys VIP Library product releases
iii. <release_version>
iv. Download Here button
v. Yes, I Agree to the Above Terms button
vi. Download `.run` file for the VIP

Figure 7-2 SolvNet Selections for VIP Download



e. Set the `DESIGNWARE_HOME` environment variable to a path where you want to install the VIP.

```
% setenv DESIGNWARE_HOME VIP_installation_path
```

f. Execute the `.run` file by invoking its filename. The VIP is unpacked and all files and directories are installed under the path specified by the `DESIGNWARE_HOME` environment variable. The `.run` file can be executed from any directory. The important step is to set the `DESIGNWARE_HOME` environment variable before executing the `.run` file.

Note The Synopsys AMBA VIP suite includes VIP models for all AMBA interfaces (AHB, APB, AXI, and ATB). You must download the VC VIP for AMBA suite to access the VIP models for AHB, APB, AXI, and ATB.

7.2.2 Downloading Using FTP With a Web Browser

a. Follow the above instructions through the product version selection step.
b. Click the "Download via FTP" link instead of the "Download Here" button.

c. Click the "Click Here To Download" button.

d. Select the file(s) that you want to download.

e. Follow browser prompts to select a destination location.

7.3 Supported Methodology, OS, and Simulator Versions

This version of CHI VIP is qualified with version R-2020.12 of SystemVerilog Verification Technology (SVT). SVT is an internal portion of the VIP and provides base VIP functionality, some utilities, and support for installation and licensing.

This version supports SVT R-2020.12 and later. The version of SVT is the key for determining which versions of platform/OS and simulators have been qualified with this VIP. Whenever a new version of SVT is released, this VIP is qualified with it.

To determine the version of SVT in an existing DESIGNWARE_HOME installation, use:

```
$DESIGNWARE_HOME/bin/dw_vip_setup -i home
```

Note Xcelium Simulator 19.09.004 is not supported in AMBA VIP release Q-2020.03.
AMBA CHI VIP Xcelium Simulator support: Xcelium version 20.09.002 is supported. Xcelium version 18.09.001 is not supported.

Note To avoid ICDPAV (Illegal Combination of Driver and Procedural Assignment to Variable) error/warning from IUS simulator, use the Bind interface provided with the VIP. Refer to tb_axi_svt_uvm_intermediate_sys example for usage of bind interface.

This table lists the supported methodology versions.

Table 7-11 Supported Methodology Versions

Methodology	Supported Version	Unsupported Version
UVM	1.1d, 1.2, 1800.2-2017-1.1	1.1a, 1800.2-2017-1.0
VMM	1.1, 1.2	NA

7.3.1 Supported Simulator Platforms

The simulator matrix table is available at the following location:

VC VIP Library page

https://spdocs.synopsys.com/dow_retrieve/latest/vg/snps_vip_lib/PDFs/simulator_matrix.pdf

For more information on the simulator matrix and library level updates, see VC VIP Library Release Notes.

This table lists the VCS simulator qualified with the current version of CHI verification IP.

Table 7-12 Supported Methodologies With Simulators

Methodology	VCS	Xcelium	Questasim
UVM 1.1d, 1.2	Supported	Supported	Supported
UVM 1800.2-2017-1.1	Supported	Not yet Supported	Not yet Supported
VMM	Supported	N/A	N/A

UVM 1800.02-1.1 is supported only with VCS.

7.4 Protocol Analyzer Version

The CHI VIP supports R-2020.12 version of Protocol Analyzer.

7.5 Known Issues and Limitations

The following features are not yet supported:

- Protocol features
  - Only single QoS value can be driven for all VCs of a transaction. Driving different values for each VC of a transaction is not yet supported.
- Methodology features
  - Event notifications
- Reset signal cannot be asserted at time 0, it needs to be asserted at least at #1 or later. See the user guide on Reset functionality for more details.
- CHI Interconnect VIP component does not support CHI-B and CHI-C features.
- IEEE Encryption and Incdir flow is supported in VCS and MTI simulators only. For more details, see the sections 2.6 and 2.7 in the VC VIP Library Installation Guide.
- IEEE 1800.2 UVM version is not yet supported.
- Euclide lint check errors are expected in UVM 1.2 with `UVM_NO_DEPRECATED` macro.
- Euclide lint check is not supported with IEEE 1800.2 UVM.
- Supported with VCS versions 2020.12-SP1 or later.
- Compatible with UVM Versions 1.1d, 1.2, 1800.2-2017-1.1.

7.6 Documentation

After the Synopsys for CHI is downloaded and installed, the documentation resides at:

```
$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/
```

The Synopsys for CHI document set includes:

- CHI UVM User Guide, which is installed at:

```
$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/chi_svt_uvm_user_guide.pdf
```

- *Synopsys Verification IP for CHI UVM Class Reference in HTML* resides at:

  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/chi_svt_uvm_class_reference/html/index.html`

- CHI VMM User Guide, which is installed at:

  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/chi_svt_vmm_user_guide.pdf`

- *Synopsys Verification IP for CHI VMM Class Reference in HTML* resides at:

  `$DESIGNWARE_HOME/vip/svt/amba_svt/latest/doc/chi_svt_vmm_class_reference/html/index.html`

Attention

Beginning in December 2014 with the J-2014.12 release, Synopsys Verification IP products adopt the release version format recommended by the company. The new version format is:

<alphabet>-<year>.<month>

<alphabet> is a single letter corresponding to the QSC foundation that the release is compliant with.

<year> is a 4-digit number corresponding to the year of the release.

<month> is a 2-digit number corresponding to the month of the release.

For patch releases, a "-<patch_number>" is appended to the release version.

For Service Pack releases, a "-SP<number>" is appended to the release version.

For example:

J-2014.12 Release in December 2014 that is compliant with the J foundation

J-2014.12-T1114 Patch on the J-2014.12 release in the month of November, 2014

J-2014.12-SP1 First Service Pack release for J-2014.12

Note Version 2.92a was the last release before the version change.

7.7 SolvNet Articles

Informative technical articles about Synopsys for CHI reside on the SolvNet website, which provides custom search features including full-text search for both HTML and PDF files.

To search for articles, go to the following URL and search for the topic of interest, such as "mipi vip":

https://solvnetplus.synopsys.com

7.8 Customer Support

To obtain support for your product, choose one of the following:

1. Go to https://solvnetplus.synopsys.com and open a case.

   Enter the information according to your environment and your issue.

2. Send an e-mail message to support_center@synopsys.com.

Include the Product name, Sub Product name, and Tool Version in your e-mail so it can be routed correctly.

3. Telephone your local support center.
   - North America:

     Call 1-800-245-8005 from 7 AM to 5:30 PM Pacific time, Monday through Friday.
   - All other countries:

     https://www.synopsys.com/support/global-support-centers.html

7.9 Notes for Release S-2021.06

- Updated VIP version as S-2021.06.
- VIP is compatible with VCS +lint= LRM_1800_2009 option.

7.9.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3682653	System Monitor does not report unwanted snoops due to dependency on axi domain type

7.9.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3684747	"Error-[FCNIPTS] Sample Method call on Null covergroup instance" from chi-e cov

7.10 Notes for Previous Releases

7.10.1 Notes for Release R-2021.03-2

- Updated VIP version as R-2021.03-2.

7.10.1.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3639513	CHI Sysco Interface feature Debug Improvements in various VIP components
3622331	SVT CHI: Need update for signal validity checks
3594626	Add CHI Random Coherency Exit sequence with various controls
3572372	unexpected [register_fail:exclusive_store_resp_check] for ex-writenosnpptl

E-STAR	Description
3568151	SVT CHI: System Monitor does not report unwanted snoops
3567829	Add dynamic reset support at sn-f vip, MCSM
3634060	Add custom IO coherent Exclusive checks in CHI system monitor
3633097	uvm_error:rn-f passive vip: check_exclusive_write_transactions
3628872	DWT write misinterpretation of DBID RESP with non-DWT write
3627541	CHI RN-F agents need to support cache clean up within protocol layer driver based on SYSCO requirements related aspects from CHI RN-Fs

7.10.1.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3638984	Sysco: Passive monitor check failure that snoop transaction observed in COHERENCY DISCONNECT phase
3638983	Sysco: Passive monitor check failure that MakeUnique transaction observed in sysco phase other than COHERENCY ENABLED
3643364	rn-f vip incorrectly asserts rxlinkactiveack after mid sim reset
3629757	Sysco: Passive monitor check failure that DVM transaction observed in COHERENCY DISCONNECT phase due to waiting on acitve_xact_queue size to decrease
3629746	Sysco: Passive monitor check failure that cacheable transaction observed in sysco phase other than COHERENCY ENABLED
3629754	Sysco: Passive monitor check failure that cacheable transaction observed in sysco phase other than COHERENCY ENABLED due to wait on get_next_item
3651849	rn-f invalidated cacheline for a non-invalidating snoop with MRU is in progress
3661296	EVICT Transaction is not marked as complete and causes simulation hang
3633934	CHI System Monitor - Atomic transaction response conversion from ACE Lite master to CHI needs fix

7.10.2 Notes for Release R-2021.03-1

- Updated VIP version as R-2021.03-1.

7.10.2.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3567830	SnpAttr field related updates in CHI DVMop request

7.10.2.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3602188	"[DT-OBAE] Out of bound access " failure from System Monitor
3602190	COMPPERSIST response associate_rsp_flit_to_xact_check failure in case of Write plus Persistent CMO transactions
3605207	axi to chi mapping: mem_attr_allocate_hint needs to be set 0 irrespective of axcache[3:2]
3594970	TLMGP/AMBA_PV: CHI response_type is not set correctly in the annotated tlmgp response for dataless transactions
3580159	TLMGP/AMBA_PV: CHI Resp[1:0] not annotated to tlm gp
3580138	TLMGP/AMBA_PV: issue in handling CHI dataless transactions
3394111	macros defined multiple times in the generated Makefile
3225363	SVT CHI: Numbering of SUB section 9.6 given in the user guide is incorrect

7.10.3 Notes for Release R-2021.03

- Updated VIP version as R-2021.03.
- Added support for Euclide (Eclipse based IDE) for lint rule checking. The VIP works seamlessly with Euclide IDE when configured with testbench rule setting and would not result in any fatal errors.
  - UVM 1.2 is supported without `UVM_NO_DEPRECATED` macro.

7.10.3.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
None	-

7.10.3.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
None	-

7.10.4 Notes for Release R-2020.12-3

- Updated VIP version as R-2020.12-3.

7.10.4.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3466648	read_data_integrity failure seen when abf_mode was configured as MAKEINVALID_mode
3466628	Update DVM req flit level checks and SNPDVMOP flit level checks
3399469	Enh to support Hardware flush of all SF/SL3 tag with new xact types
3517178	rn-f vip sends MRU with an invalid initial tag state
3540800	Single chip Kampos TB regression analysis and Sequence related fixes
3535985	Add support for successful non coherent exclusive load store pair with mismatched addr and data_size
3533163	Out of bounds check error
3530802	SVT CHI: Provide a method to map HN index based on address , initiating RN and system env index

7.10.4.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3474714	associated_tagmatch_response_legal_resp_check to be updated based on MTE support
3467189	Association failure of StashOnceUnique to SnpUniqueStash due to inbetween PrefetchTgt
3533505	trans_chi_e_num_outstanding_xacts_from_diff_src_id_wrt_src_id_of_current_txn_which_received_dbidrespord

7.10.5 Notes for Release R-2020.12

- Updated VIP version as R-2020.12.

7.10.5.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
None	-

7.10.5.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
None	-

7.10.6 Notes for Release R-2020.09-3

- Updated VIP version as R-2020.09-3.

7.10.6.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3422902	Add check related to PcrdGrant and dvm resp flit order
3426451	Add check related to atomic_compare and atomic_swap tag
3425162	Protocol checks related to reception of new snoop request at RN-F
3425161	protocol checks related to DBID field in read data and Comp/DBIDresp responses
3430968	Add X/Z checks on control signals
3422995	Add check related to resp filed for the tag_match response
3430598	Flit level check on groupid_ext field of write type transactions
3431300	Flit level check on reserved fields of a req/rsp/dat/snp flit
3449616	System level check on software rules, same memory and snoop attributes for outstanding transactions targeting same addr
3450902	MRU sequence self-check and cache initialization updates
3450557	Port level check: end of simulation outstanding protocol credits
3455723	Update svt_chi_system_req_order_noncoherent_xact_directed_virtual_sequence for addr_mode, additional writes

E-STAR	Description
3456753	CHI-E - Support to Drive Exclusive Store even when the Cache line is Invalid
3456874	System Level Covergroups: Concurrent overlapping transaction between each pair of CHI RN_F ports
3453763	WriteBackptl and WriteBackFull_CMO transactions legal cache state checks enhancement

7.10.6.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3430594	Incorrect new_req_before_completion_of_previous_read_write_xact_to_same_cacheline_check failure between Read and Write at SN
3431871	SVT CHI System Monitor: coherent_req_compack_hazard_check failure
3394175	Compile error on adding macro SVT_AXI_SNOOP_FROM_SLAVE_ENABLE
3421973	writeevictfull does not remove the cacheline in rn-f
3446078	Combined Ptl Write + CMO has invalid byte enable settings
3426483	Issue seen with Interconnect VIP with updating the resp field for TagMatch response
3381932	valid_retry_xact_check error seen on active SN VIP
3440953	System Level Check: coherent_write_read_hazard_check failure between Wr+CMO and ReadShared transactions
3453770	System Level Check: atomic_returned_initial_data_integrity_check failure
3440946	Protocol Level Check: new_req_before_compdbid_resp_for_copyback_to_same_cacheline_check failure in case of Combined copyback write cmo transactions
3440945	Protocol Level Check: valid_parity_datacheck_for_read_data_check failure in case of MRU transaction

7.10.7 Notes for Release R-2020.09-2

- Updated VIP version as R-2020.09-2.

7.10.7.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3393394	System level coverage implementation for two-part stash transaction
3398521	Updating CHI VIP to remove some rules related to DBIDRespOrd which were in draft CHI-E spec, but not in public CHI-E spec
3393470	chi_sys_mon handling write xact endTime and read xact beginTime overlap scenario
3408169	CHI-E.a Support: Memory Tagging
3405769	Update current_state field for dataless and Read transactions
3400647	Updates to not generate WriteCleanPtl transaction for CHI Issue B or later
3349451	incorrect callback name in the rn-f vip message
3344050	CHI Back to Back DVM sync generation from VIP
3366695	SnpPreferUniqueFwd Enhancements
3353619	Enhancement to handle WriteUnique*Stash with associated stash snoops
3322776	remove the dependency of RN-F vip on num_hn where ever possible
3346255	Multi RN port random sequence (svt_chi_system_coherent_virtual_sequence) updates
3389257	Coherent snoop transaction macro to include SnpMakeInvalid snoop transaction for ROCI and ROMI
3389259	OO ICN: SN agent protocol layer check: Incorrect new_req_before_completion_of_previous_read_write_xact_to_same_cacheline_check failure between READNOSNPSEP and WRITENOSNPPTL
3334103	SVT CHI: Add support for 'CleanSharedPersistSep' Transaction in SN VIP
3225112	support ace5lite xacts READONCECLEANINVALID,READONCEMAKEINVALID in chi sys mon
3355000	Add support for forwarding of normal CMOs and Persist CMOs in interconnect VIP
3371137	SVT CHI System Monitor: Need support for ACE5 Lite transactions
3344063	ReadClean is going out from UD state causing read_tag_integrity_check error
3329964	SVT CHI: Add support for READNOSPNSEP at RN VIP
3353919	SVT CHI: Add support for DMT READNOSNP in back2backsetup
3352262	Data integrity error due to unscheduled MakeInvalid xact
3393317	Update to valid_exclusive_access_for_dmt_check based on latest ARM response
3379553	Add checks in AXI to CHI bridge to flag unsupported transactions

E-STAR	Description
3363721	read_data_integrity_check error due to overlapping READ (dirty snoop data) and WRITE
3363730	CHI DVM SYNC transaction outstanding coverage
3374217	add more info to is_valid UVM_FATAL messages
3379444	CHI_E.a spec update for RPU
3387800	Coverage on "other permitted" initial cache state in RN-F VIP
3366696	ICN Full Slave setup support with INCISIV/15.20.037
3225122	Add support for "UCE, UDP states in active RN-F VIP"
3374219	Request VC command received is Reserved and cannot be used:add opcode value in
3389256	Active SN to process the transaction only after the previous transactions to the same cache-line are completed
3152415	allow "other permitted" initial states in RN-F VIP
3155635	incorrect address tagging in chi vip
3334104	SVT CHI: Add support for 'CleanSharedPersistSep' in RN VIP for RN-SN b2b TB
3401003	Support SnpUniqueStash as a valid snoop for StashOnceUnique/StashOnceSepUnique
3405292	Valid StashLPID value StashLPIDValid is set to 0 in Snoop flit check
3399460	Enh CHI Sys Mon to associaite SnpUniqueStash snoop xact for StashOnceUniqe
3413261	Support SnpOnce as a valid snoop for StashOnceUnique/StashOnceSepUnique
3383683	System Monitor support for StashOnceSepUnique & StashOnceSepShared

7.10.7.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3389291	Invalid cache and tag state combination at the end of CU/MRU transactions
3385052	DVMOp transaction pack/unpack APIs should not check for address alignment
3413565	get_hn_idx() should not be called when target id remapping is enabled
3407890	Incorrect new_req_before_compdbid_resp_for_copyback_to_same_cacheline_check failure between transactions Cleanshared and Writebackfull_cleanshared
3407043	Incorrect RN cache state transition observed for ReadClean transaction with tag_op Transfer

B-STAR	Description
3334931	error: "Expected a reservation for cache allocation, but no reservation found"
3331686	incorrect response for SNPONCE from RN-F VIP
3340747	invalid error "illegal_tx_rx_state_transition_combinations" from rn-f vip
3389258	CHI System Level: transaction_completion_and_observability_hazard_check failure where the current transaction is ReadShared and the reference transactions is ROMI
3394517	CHI System Level: coherent_req_compack_hazard_check failure between CleanShared and WriteUniqueFull
3362893	CHI rn-f VIP Keeping TXRSPFLITV, TXDATFLITV, RXDATLCRDV Asserted after Reset
3285411	CHI RN-F VIP Incorrectly Sending MRU
3383110	rx_link_not_active_during_flit_reception pointing to incorrect link state
3350759	UVM_FATAL [remove_from_rn_active] Did not find current xact(object_num:253) in a
3379294	incorrect info in html doc for single_req_order_stream_check
3355207	Incorrect snoop association with hazard xact due to delayed CompAck with CHI-D/E OWO writes
3383107	"[SIOB] Select index out of bounds" from svt_axi_snp_xact_to_chi_snp_xact_sequen
3379445	StashDone association logic update to avoid multiple StashDone response association with the StashOnceSep transaction
3389254	CHI System Level: atomic_returned_initial_data_integrity & read_data_integrity failures observed as a consequence of overlapping WriteUniqueFull and ReadOnceMakeInvalid transactions
3365796	Update valid_exclusive_access_for_dmt_check for RPU and MRU
3389234	SN agent protocol layer check: Incorrect new_req_before_completion_of_previous_read_write_xact_to_same_cacheline_check failure between read and write
3389254	CHI System Level: atomic_returned_initial_data_integrity & read_data_integrity failures observed as a consequence of overlapping WriteUniqueFull and ReadOnceMakeInvalid transactions
3365796	Update valid_exclusive_access_for_dmt_check for RPU and MRU
3389232	RN agent protocol layer check: Incorrect dbid-reuse failure dat_flit_dbid_check
3389255	CHI System Level: coherent_req_compack_hazard_check failure observed between the transactions CleanInvalid and ReadOnceMakeInvalid

B-STAR	Description
3398256	[CHI-VIP] Update CHI Address Tagging Computation in CHI Snoop Transaction and System Virtual Sequence

7.10.8 Notes for Release R-2020.09

- Updated VIP version as R-2020.09.

7.10.8.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
None	-

7.10.8.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
None	-

7.10.9 Notes for Release Q-2020.06-3

- Updated VIP version as Q-2020.06-3.

7.10.9.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
None	-

7.10.9.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
None	-

7.10.10 Notes for Release Q-2020.06-2

- Updated VIP version as Q-2020.06-2.

7.10.10.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3283605	Driving memattr[3](allocate) for copyback transactions with transaction attribute mem_attr_allocate_hint
3253661	dynamic reset behavior of rn-f vip: option to flush out all xacts in internal q
3293241	CHI VIP Dynamic reset to flush all xacts (outstanding+unscheduled)
3243039	remove the ordering restriction of txrsp channel ownership in vip implementation
3306282	Solution to handle SNP xact related checks without any conventinal matching COH xact
3285688	SNPUNIQUE generated for STASHONCEUNIQUE xact by ICN
3319324	print chi system configuration key topology settings for ease of debug
3294987	Issue with CHI System Monitor routing
3225120	Support for "Wr+PCMOs (Wr+CSPSep) from RN to HN"
3225121	add support for "two part stashonce - StashOnceSepUnique and StashOnceSepShared"

7.10.10.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3311080	MRU: ICN Full slave not setting resp_pass_dirty bit in Read data response
3308238	[register_fail:protocol:CMO:persist_cmos_forwarded_to_slave_by_hn_with_forward_p
3285411	CHI RN-F VIP Incorrectly Sending MRU
3286540	[write_into_cache] Expected a reservation for cache allocation, but no reservation
3304717	constraint issue with fwd_state_pass_dirty when initial tag state is dirty
3314590	SVT CHI: DBID is incorrectly Reused by the ICN slave VIP response
3318745	Failed to load extension.xml in Verdi for chi_svt
3321163	Deadlock scenario observed with outstanding write* transactions when dwt is enabled
3319322	coherent-snoop mapping info extraction causes errors with unmapped hn idx
3319320	Interconnect VIP incorrectly sends slave transaction to fetch tags even when memory tagging disabled
3318766	MTI latest 2019.4 : Compile error in svt_chi_system_monitor_system_data.sv file
3319332	amba multi-chip monitor causes unmapped hn idx errors

B-STAR	Description
3326771	Interconnect VIP: Incorrect higher order VA bits in P1 and P2 payloads when Max VA width is 53

7.10.11 Notes for Release Q-2020.06-1

- Updated VIP version as Q-2020.06-1.

7.10.11.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3225119	CHI-E: add support for "DBIDRespOrd"
3279258	incdir flow support in CHI SVT VIP
3269122	SVT CHI:ncbwrdatacompack_flit_timing_check from passive RN to be disabled when there are multiple request order streams
3269050	CHI-B and later: add Sysco interface signals support in RN bind if
3271681	Add missing `ifndef guard macro for SVT_CHI_*SETUP/HOLD*TIME defines
3263836	SVT CHI: Update 'dat_flit_dbid_check' for WRITENOSNPZERO transactions
3280146	relax the compack ordering restrictions in rn-f vip implementation for read xact
3284720	Update to CHI_E covergroups name to reflect spec revision to be consistent with existing cover groups
3274592	Update get_dbid API to randomly generate an unused DBID

7.10.11.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3275524	Incorrect snp_xact_flow_category attribute of Snoop transactions in case of multiple snoop data flits
3275511	Invalid Copyback transaction WRITECLEANPTL opcode bin in CHI ISSUE B covergroup
3272034	Link layer CG's in Passive RN not hit : <rxsnp/txrsp>_vc_num_return_lcredits_in_<rxla/txla>_deactivate_state
3271653	CHI-E Verdi PA signal grouping issue on DAT and RSP flits fields
3270284	Incorrect exclusive_chi_transaction_type_check with PREFETCHTGT TYPE
3275508	Incorrect construction and sampling condition for MRU/RPU X is_exclusive covergroups
3270278	back to back Makereadunique is not getting generated J1757

B-STAR	Description
3282016	Incorrect final cache state for a snpunique when previous outstanding coherent xact with RESPSEPDATA flow
3228140	rn-f vip stuck on check_active_queue_for_req_ownership method
3261077	typo in naming of system_configuration attribute odering_checks_enable , should be ordering_checks_enable
3285407	update description of svt_chi_link_err_check::snoop_flit_snpreq_check
3284609	VIP sending WriteUniqueZero when in SD state
3274593	Guard complex coveargе under advanced_transaction_coverage_enable
3274594	Constraint solver error in Interconnect VIP: for wnsptl* tag_transfer is not applicable
3248054	AMBA Release are broken for VCATB Flow

7.10.12 Notes for Release Q-2020.06

- Updated VIP version as Q-2020.06.
- Support for Interface Signal Grouping feature in Verdi nWave through Verdi Protocol Analyzer has been added in SVT AMBA CHI VIP from vip_amba_svt_Q-2020.06 release with Verdi 19.06, Verdi 20.03 or later versions.

7.10.13 Notes for Release Q-2020.03-3

- Updated VIP version as Q-2020.03-3.

7.10.13.1 Enhancements/E-STARs

This table lists the enhancements done in this release:

E-STAR	Description
3205065	Cancelling retry transactions in passive mode
3190002	Enh to handle coh-to-snp association for SNPMAKEINVALIDSTASH sent after WU_FULLSTASH is completed when SF miss
3178120	svt_axi_cache::set_tag(),svt_axi_cache::get_tag() APIs to be enabled in html doc
3225117	add support for "Persistent CMO With Two Part Response"
3223556	FLITV delays of 1 bubble in snoop response of 4 consecutive flits(QCOM J1734)
3223557	cover group to track number of transactions NOC can send on snoop channel of VIP without VIP sending back snprsp
3129002	CHI System Monitor : Support custom coherent Exclusive access from ACE-Lite masters
3108478	Enh for CHI sys mon to correlate slave RD&WR xact pair for single WRITE xact (READ MODIFIED WRITE)

E-STAR	Description
3128758	CHI System Monitor: Support Atomics from AXI/ACE-Lite slaves
3156633	SVT CHI : Complete Dynamic Reset Support in CHI VIP
3152875	Support custom non-coherent Exclusive access load-store parameter matching
3128756	CHI System Monitor: Support Memory tagging aspects from AXI/ACE-Lite masters, slaves
3217956	TXFLITV "x" during reset
3112460	Updates to Hazard Checks wrt CHI-D scenarios
3190561	allow_first_exclusive_store_to_succeed:clarify the description
3225118	add support for "Deep Persistent Cache Maintenance" in RN-F VIP
3242024	Interface Signal Grouping Support for CHI-D/E

7.10.13.2 Bug Fixes/B-STARs

The following are the bug fixes done in this release:

B-STAR	Description
3202261	Deadlock at RN driver due to limitations in the TXRSP channel ownership logic
3205076	Scenario coverage enabled even after setting transaction_scenario_coverage_enable = 0
3219753	Error-[FCNIPTS] Sample Method call on Null covergroup instance
3217940	One of the CHI write data transaction didnt associate with any request (Qcom J1714)
3212466	Issues in the association of write data flits with Atomic/Write transactions
3224062	ICN Full slave VIP not updating the Interconnect memory with Snoop data responses
3217941	VIP driving BE as 'hffffffff on writedata flit for CopyBackWrData_I (QCOM J1716)
3181314	NOA from CHI system monitor when perf_tracking_enable=1
3217947	makereadunique_data_response_cache_data_match_check false error (QCOM :J1697)
3147910	constraint solver failure with amba_svt/Q-2019.12-2-T-20200205

7.10.14 Notes for Release Q-2020.03

- Updated VIP version as Q-2020.03.

7.10.15 Notes for Release Q-2019.12

- Updated VIP version as Q-2019.12.

7.10.16 Notes for Release P-2019.09

- Updated VIP version as P-2019.09

7.10.17 Notes for Release P-2019.06

- Updated VIP version as P-2019.06.

7.10.18 Notes for Release P-2019.03

- Updated VIP version as P-2019.03.
- Sequence level configuration to generate aligned/unaligned address.
- Coverage for counting back to back transactions occurring during a simulation.
- Support sending `prefetchtgt` transaction to an address with an outstanding Write transaction.

7.10.19 Notes for Release O-2018.12

- Updated VIP version as O-2018.12.
- Added support for CHI Issue B and Issue C specification.

7.10.20 Notes for Release O-2018.09

- Updated VIP and SVT version as O-2018.09.

7.10.21 Notes for Release O-2018.06-3

The following (CHI-B and CHI-C) features are the Early Adopter features. For more information on the documentation of the features, contact Synopsys.

- The following table lists the new and changed features in this release.

Table 7-13 STAR Fix Information

STAR	Description
9001306119	Snoop filter back invalidation needs to be handled by chi system monitor.

- Support for Device type CMOs.
- Support for Link State Machine delays.
- Support for generating DVM sync without prior non-sync from active RN. See the bit type attribute `esvt_chi_node_configuration::allow_dvm_sync_without_prior_non_sync` (default is 0) in CHI Class Reference HTML.
- Support for generating `byte_enable` as 8'hFF by default through VIP constraints for DVM requests from active RN, without relying on testbench to set this explicitly.
- Built in XOR function based address map support for 64 HN-Fs.
- Added the following flag to the cache initialization sequence (`svt_chi_system_cacheline_initialization_virtual_sequence`):
  - bit `send_init_xacts_from_other_rn_f_nodes`
- Support for ReadSpec transaction type.
  - Added a configuration attribute `svt_chi_system_configuration::readspec_enable` with default value of 0, such that by default, ReadSpec transactions and related aspects are not enabled with VIP. This is a deprecated feature from CHI-B draft specification to CHI-B public specification.

- System monitor enhancement to detect snoops due to snoop filter back invalidation and indicate the same through the bit attribute `svt_chi_snoop_transaction::back_invalidation_snoop`.
- Secure/Non-Secure Region support:
  - Added support for differentiating secure/non-secure regions to all the CHI VIP components except Interconnect VIP.
- WriteDataCancel support.
- System monitor update to support data integrity checks for DEVICE memory type transactions.
- DVM checks across ACE-Lite+DVM master agents and CHI RN agents.
- Exclusive Access:
  - Support for coherent exclusive load followed by multiple coherent exclusive stores to same address.
  - Support for coherent exclusive store without associated coherent exclusive load.
- Protocol layer delays in Active RN agent:
  - Delay Controls for all the tx flits through `svt_chi_rn_transaction` and `svt_chi_rn_snoop_transaction`, to control delay between flit being available at Link layer and assertion of corresponding TX***FLITPEND signal.
- Support for snoopable and non-snoopable domains.
- Support for Atomic Ops.
- CHI-B: Support for Data Check and Poison.
- CHI-B: Support for System Coherency Interface.
- CHI-B: Support for Data Source.
- CHI-B: CopyBack Cancellation.
  - Support for CopyBack cancellation rules in case of CopyBack Snoop Hazard as specified in the CHI-B specification.
- CHI-C: CompAck without waiting for all the CompData and DataSepResp flits.
- CHI-C: Support for Combined CompAck with WriteData.
- CHI-C: Separate Read Data and Comp Response (for Data sent to the Requester from Home or Slave).
- CHI-C: Response after receiving first Data packet.
- CHI-C: Error Handling.
- CHI-C: CCF Wrap Order support:
  - Added support for CCF Wrap Order feature to all the CHI VIP components except Interconnect VIP.
- CHI-C: Trace Tag support:
  - Added support for Trace Tag feature to all the CHI VIP components.

7.10.22 Notes for Release O-2018.06

The following are the Early Adopter features. For more information on the documentation of the features, contact Synopsys.

- Support for Secure/Non-Secure Region.
  CHI VIP components except Interconnect VIP supports differentiating secure/non-secure regions.
- Support for CCF (Critical Chunk First) Wrap Order.
- System Monitor updates:
  - Support for Master Slave correlation Based checks in System Monitor:
    - Hazard checks
    - Memory attributes
    - Rquest ordering and end-point ordering
    - Propagation of attributes beyond HN
  - Updates to support data integrity checks for DEVICE memory type transactions.
  - DVM checks across ACE-Lite+DVM master agents and CHI RN agents.
  - Added callbacks for the following:
    - Coherent to snoop transaction association controllability.
    - Master to slave transaction correlation controllability.
- Enhanced support for Protocol Retry Feature.
  Active RN agent relinquishes the txn_id of the transaction that receives RetryAck.
- Support for Single Outstanding transaction per TxnID.
- Exclusive Access updates:
  - Support for Partial address comparison support for CHI coherent exclusive access.
  - Support for coherent exclusive load followed by multiple coherent exclusive stores to same address.
  - Support for coherent exclusive store without associated coherent exclusive load.
- Coverage updates:
  - System Level:
    - System level path coverage related cover groups.
  - Link Layer:
    - Signal sequences coverage updates.
    - Link active state machine path coverage updates:
      Expected paths from stop-run, run-stop.
      All possible paths from stop-run, run-stop.
      From each state to all possible immediate next states.
    - Several link layer coverage updates including LCRDV counters.
    - Corresponding enhancements in the RN agent's link layer driver and monitor components.
    - Added configuration attribute `svt_chi_node_configuration::link_coverage_enable`.
  - Protocol Layer:
    - Transaction scenario coverage at RN agent:
      Ordering scenarios.
    - Outstanding counters related coverage at RN agent:
      Outstanding RN transactions, DVM transactions, DVM Snoop transactions.

- Transaction flow coverage at RN agent:
  RN transaction flow coverage including Retry.
  RN snoop transaction flow coverage.
- Cache state coverage at RN agent:
  Coherent transaction cache state coverage including response combinations wherever applicable.
  Snoop transaction cache state coverage including response combinations wherever applicable.

- Various transaction fields related cross coverage at RN agent.

- Support to specify custom RN System Address Map (address to HN mapping) through factory override mechanism on `svt_chi_system_configuration.`
- Support for Port level Protocol checks to verify target ID remapping by Interconnect.
- Support for Port level Protocol checks to verify communicating node pair types with target ID remapping by interconnect.
- Support related to using different `qos`, `req_rsvdc`, `txn_id, tgt_id` (remapped/original) with retried xacts.
- Support to generate random `tgt_id` from active RN agent.
- Support to capture original `tgt_id` and whether `tgt_id` is remapped or not.
- Support to handle credit counters and field-comparison for correlating with retried xacts, factoring in target ID remapping.
- Support for handling Evict transactions to evict the line when starting the transaction, and system monitor Snoop filter updates on same lines.
- Support for Port level Checks for various cases of single outstanding requests per address when the ordering is not enabled.
- Support to generate random `src_id's` from active RN agent.
- Support for Protocol layer delays - Active RN agent:
  Delay Controls for all the tx flits through `svt_chi_rn_transaction` and `svt_chi_rn_snoop_transaction` to control delay between flit being available at Link layer and assertion of corresponding TX***FLITPEND signal.

7.10.23 Notes for Release N-2018.03-1

- Enhancements to specify custom RN System Address Map (address to HN mapping) through factory override mechanism on `svt_chi_system_configuration.`
- Port level Protocol checks to verify target ID remapping by Interconnect.
- Port level Protocol checks to verify communicating node pair types with target ID remapping by interconnect.
- Enhancements related to using different qos, `req_rsvdc`, `txn_id,and tgt_id` (remapped/original) with retried xacts.
- Enhancements to generate random `tgt_id` from active RN agent.
- Enhancements to capture original `tgt_id` and check if `tgt_id` is remapped or not.
- Updates to Driver, monitor for Protocol retry related stuff, specific to CHI-B specification: Updates to fields comparison when correlating retried xacts with original xacts.

- Updates to handle credit counters and field-comparison for correlating with retried xacts, factoring in target ID remapping.
- Updates related to Atomics and ReadOnce* ordering.
- Updates for handling Evict transactions to evict the line when starting the transaction, and system monitor Snoop filter updates on similar lines.
- Driver updates to ensure single outstanding requests per address when the ordering is not enabled.
- Port level Checks for various cases of single outstanding requests per address when the ordering is not enabled.
- System level Hazard checks update for WriteUnique and DBIDResp scenarios.
- Enhancements to generate random `src_ids` from active RN agent.
- Support for CHI PrefetchTarget transaction.
- Support for new `readreceipt_policy` of `READRECEIPT_WITH_DATA`. For more information on `readreceipt_policy`, see CHI Class Reference HTML documentation.
- Support for Interleaving port. For more information on Interleaving port, see CHI User Guide documentation.
- Support for snoopable and non-snoopable domains.

7.10.24 Notes for Release N-2018.03

There are no new features for this release.

7.10.25 Notes for Release N-2017.12-1

- Added support for Atomic Ops feature.
- Added support for CHI Coherent Port Interleaving.
  Following members are added for this feature:
  - `svt_chi_node_configuration::port_interleaving_enable`
  - `svt_chi_node_configuration::port_interleaving_size`
  - `svt_chi_node_configuration::port_interleaving_group_id`
  - `svt_chi_node_configuration::dvm_sent_from_interleaved_port`
  - `svt_chi_node_configuration::device_xact_sent_from_interleaved_port`
  - `svt_chi_node_configuration::port_interleaving_index`
  - `svt_chi_node_configuration::port_interleaving_for_device_xact_enable`

7.10.26 Notes for Release N-2017.12-T-20171124

- SVT version: M-2017.06.
- Common version: M-2017.09.
- Added support for the following CHI-B features in the VIP. See chi_b_svt_uvm_user_guide.pdf and chi_b_svt_uvm_class_reference documentation for more details on usage and limitations.
  - Direct Cache Transfer
  - DoNotGoToSD
  - RetToSrc

- SharedClean state return

- In addition to updating existing port level protocol layer, link layer checks and CHI system monitor checks, added following checks to CHI system monitor:
  - `only_one_forward_snoop_per_coherent_transaction_check`
  - `only_one_snoop_with_rettosrc_check`
- Updated the ExpCompAck related constraints and checks for CMO transactions, as per the CHI Issue B specification.
- Updated the Ordering rules for WriteUnique transactions, as per the CHI Issue B specification.

7.10.27 Notes For release N-2017.12

The following are the updates for this release:

- VIP version updated as N-2017.12.
- SVT version updated as N-2017.12.
- CHI UVM User guide (chi_svt_uvm_user_guide.pdf) document contains the usage information related to AMBA CHI VIP compliant to 'ARM® AMBA® 5 CHI Architecture Specification - Issue A (ARM IHI 0050A)'.
- For more information related to VIP usage and support for the new CHI Issue B features as specified in 'AMBA CHI VIP compliant to 'ARM® AMBA® 5 CHI Architecture Specification - Issue B (ARM IHI 0050B)', see CHI-B UVM User Guide (chi_b_svt_uvm_user_guide.pdf).

Note

CHI VIP will be part of standard AMBA release from N-2017.12 onwards.

7.10.28 Notes For release M-2017.06-3-T-20170907

The following changes have been made for this release:

- CHI Issue B feature support:
  - Added support for variable address width.
  - Added support for variable Node ID width.
  - Added support for PA/VA expansion in DVMOp transactions.

7.10.29 Notes for Release M-2017.06-3-T-20170901

- Added support for Wrap type burst in the TLM GP sequence.
- Bug Fixes.

7.10.30 Notes for Release M-2017.06-2-T-20170814

The following changes have been made for this release:

- CHI Issue B feature support:
  - Updates to protocol checks for CompData response of ReadNoSnp, ReadOnce, ROMI, ROCI.
  - CompData_UD_PD is added as valid response for ReadUnique with initial cache line state being SD. This is based on CHI-A errata.

7.10.31 Notes for Release M-2017.06-2-T-20170803

The following changes have been made for this release:

- Updates for CHI-A VIP sequences that are part of system virtual sequence collection to handle retry scenarios.
- Support for cache visualization in VERDI.
- Support for Multi reset mode for CHI Interface where different RN, SN agents can have different reset signals connected.

7.10.32 Notes for Release M-2017.06-1-T-20170707

The following changes have been made for this release:

- CHI Issue B feature support:
  - Updated CHI RN/SN agent, CHI Interconnect VIP and CHI System monitor to support the following transactions defined in the CHI Issue B spec: ReadOnceMakeInvalid (ROMI), ReandOnceCleanInvalid (ROCI) and CleanSharedPersist.
  - Added system virtual sequences to support the new transactions.
    For more information about the CHI Issue B features supported by the VIP, refer to chi_b_svt_uvm_usere_guide.pdf
  - Added new protocol and system level checks. Refer to the chi_b_svt_uvm_class_reference HTML class reference to look at the implemented checks

7.10.33 Notes for Release M-2017.06-1-T-20170706

- Bug Fixes.

7.10.34 Notes for Release M-2017.06-T20170609

The updates for this release are as follows:

- SVT Version: M-2017.06
- Common Version: M-2017.06
- Target ID remapping feature support:
  - Added controls in `svt_chi_system_configuration` to indicate if the interconnect supports target ID remapping and is presumed to be remapped to the target ID. For more information, see the AMBA CHI UVM User guide.
  - Updated CHI Request Node/Slave Node (RN/SN) agent, CHI Interconnect VIP and CHI System monitor to handle target ID remapping scenarios.
- Added new link and protocol layer checks, as well as, new covergroups in the node monitor. For more information on implemented checks and covergroups, see the AMBA CHI Class Reference Guide.
- Added support for MTI.
- Added coverage support for Link layer activation and deactivation. This can be enabled by setting `svt_chi_node_configuration:: link_activation_deactivation_coverage_enable` in the agents. For more details, see HTML class reference documentation.

- Added capability in the RN and SN agents to monitor the performance of a system, based on configuration parameters.
- Bug Fixes.

7.10.35 Notes for Release M-2017.03-3-T0526

The following changes have been made for this release:

- CHI Issue B feature support:
  - Updated the interfaces and data classes to include the new flit fields as well as accommodate the change in the width of certain existing fields, as per the CHI Issue B specification.
  - Updated CHI RN/SN agent, CHI Interconnect VIP and CHI System monitor to support two new Reads defined in the CHI Issue B spec: ReadSpec and ReadNotSharedDirty.
  - Added system virtual sequences to support the new Read transactions.
  - For more information about the CHI Issue B features supported by the VIP, refer to chi_b_svt_uvm_user_guide.pdf.
  - Added support for Target ID remapping. For more information about this feature, refer to chi_svt_target_id_remapping_user_guide.pdf.
  - Added new protocol and system level checks. Refer to the chi_b_svt_uvm_class_reference HTML class reference to look at the implemented checks.

7.10.36 Notes for Release M-2017.03-2-T0412

The following changes have been made for this release:

- Exclusive transactions feature support:
  - Added controls in `svt_chi_node_configuration` to enable exclusive access and exclusive monitors at each node. Refer to the HTML class reference for more information.
  - Updated CHI RN/SN agent, CHI Interconnect VIP and CHI System monitor to handle Exclusive accesses.
- Added new protocol and system level checks, as well as, new covergroups in the node monitor. Refer to the HTML class reference to look at the implemented checks and covergroups
- Bug Fixes

7.10.37 Notes for Release M-2017.03-1-T0320

The following changes have been made for this release:

- Outstanding transactions feature enhancement:
  - Added controls in `svt_chi_node_configuration` to set separate maximum number of outstanding transactions, at a node, for various transaction type categories.
  - Added counters in the shared status object of the RN/SN agents to track the outstanding transactions at the respective nodes.
- Added new covergroups in the node monitor. Refer to the HTML class reference to look at the implemented covergroups
- Bug Fixes

7.10.38 Notes for Release M-2016.12-3-T0222

The following changes have been made for this release:

- Added Support for Protocol and System level checks coverage. To know how coverage can be enabled for the checks, refer to the following parameters in the HTML class reference:
  - svt_chi_node_configuration::ll_protocol_checks_coverage_enable ,
  - svt_chi_node_configuration::pl_protocol_checks_coverage_enable
  - svt_chi_system_configuration::system_checks_coverage_enable
- Added new protocol and system level checks, as well as, new covergroups in the node monitor. Refer to the HTML class reference to look at the implemented checks and covergroups
- Bug Fixes

7.10.39 Notes for Release L-2016.06-2-T0802

The following changes have been made for this release:

- The following metrics are added to native VERDI performance analyzer:
  - `chi_ctrans_request_read_bus_bandwidth`
  - `chi_ctrans_request_write_bus_bandwidth`
- Added support for linking the PA objects to corresponding CHI interface signal activity within FSDB. For more information, see “Protocol Analyzer Support” section in the *Verification IP* for *CHI SVT UVM User Guide*.
- Bug fixes

7.10.40 Notes for Release L-2016.06-1-T0617

The following changes have been made for this release:

- Licensing updates for the CHI SVT: It includes--
  - new license features: VIP-AMBA-CHI-SVT and VIP-AMBA-CHI-BETA-SVT
  - deprecated license features: VIP-AMBA5-CHI-SVT and VIP-AMBA5-CHI-BETA-SVT

  For more information, see the “Licensing Information” section in Chapter 2, “Installation and Setup", in the *Synopsys Verification IP for CHI UVM User Manual*.
- Added the sequence `svt_chi_rn_snoop_response_sequence` to existing CHI RN snoop transaction sequence collection
- Support for external master, slave agents within AXI system env
- Bug fixes

7.10.41 Notes for Release L-2016.03-3-T0602

The following changes have been made for this release:

- The following checks are added to node link layer monitor
  - Checks during reset
    - signal_valid_txlinkactivereq_during_reset
    - signal_valid_txlinkactiveack_during_reset

- signal_valid_rxlinkactivereq_during_reset
- signal_valid_rxlinkactiveack_during_reset
- signal_valid_txreqflitv_during_reset
- signal_valid_rxreqflitv_during_reset
- signal_valid_txreqlcrdv_during_reset
- signal_valid_rxreqlcrdv_during_reset
- signal_valid_txrspflitv_during_reset
- signal_valid_rxrspflitv_during_reset
- signal_valid_txrsplcrdv_during_reset
- signal_valid_rxrsplcrdv_during_reset
- signal_valid_txdatflitv_during_reset
- signal_valid_rxdatflitv_during_reset
- "signal_valid_txdatlcrdv_during_reset
- signal_valid_rxdatlcrdv_during_reset
- signal_valid_rxsnpflitv_during_reset
- signal_valid_rxsnplcrdv_during_reset

- X/Z checks
  - signal_valid_txlinkactivereq_check
  - signal_valid_txlinkactiveack_check
  - signal_valid_rxlinkactivereq_check
  - signal_valid_rxlinkactiveack_check

- The following checks are available in the node protocol layer monitor. They have been migrated from svt errors to svt error check infrastructure
  - DAT flit field checks
    - dat_flit_data_id_check
    - tx_dat_flit_data_id_check
    - rx_dat_flit_data_id_check
    - valid_ccid_in_dat_flit_check
    - valid_rsp_flit_dbid_check
    - valid_dat_flit_dbid_check
  - Request ordering checks
    - single_req_order_stream_check
  - Valid Data flit type checks
    - valid_dat_flit_type_for_snp_xact_check
    - valid_noncbwrdata_flit_for_xact_check
    - valid_cbwrdata_flit_for_xact_check
    - valid_compdata_flit_for_xact_check
  - Valid Response flit type checks
    - valid_rsp_flit_type_for_snp_xact_check

        - single_outstanding_req_per_txn_id_check
        - valid_compack_rsp_flit_check
        - valid_comp_flit_type_for_xact_check
        - valid_dbid_flit_type_for_xact_check
        - valid_snprsp_for_snpdvmop_check
        - valid_snprsp_flit_check
    - Associate flit to xact checks
        - associate_readreceipt_to_xact_check
        - associate_rsp_flit_to_xact_check
        - assoiciate_read_dat_flit_with_xact_check
        - associate_write_dat_flit_with_xact_check
        - associate_snprspdata_flit_with_snp_xact_check
    - Retry xact checks
        - valid_p_crd_type_in_pcrdreturn_flit_check
        - valid_retry_xact_after_pcrdcgrant_check
        - valid_retry_xact_check
        - valid_pcrdreturn_check
    - DVM checks
        - single_outstanding_snpdvmop_sync_check
        - single_outstanding_snpdvmop_per_txn_id_check
        - valid_snpdvmop_part_check
        - valid_order_of_dvmop_rspflits_check
        - valid_rspflit_for_dvmop_check
    - Barrier checks
        - valid_resp_err_status_for_barrier_xact_check
    - Snoop request validity checks
        - valid_rn_d_snoop_flit_check
        - valid_rn_i_snoop_flit_check
- The following enhancements are made to native FSDB dumping
    - Dropped transactions due to invalid initiate cache line state from Active RN are dumped into FSDB
    - System monitor:
        - System level performance metrics are dumped and correlated to corresponding transaction objects
        - Relationship between Coherent and associated snoop transactions for all coherent and dvm transactions is established
- Enhanced CHI system monitor summary tracing for DVM transactions
- Updates to transaction coverage to fix coverage holes
- Updates to CHI system virtual sequences to add controls to specify:

- Flow control and outstanding feature sequences:
  - Initiating RN indices
  - Target HN indices
- Outstanding feature sequences:
  - Number of outstanding transactions at HN

- CHI VIP supports native VERDI performance analyzer from VERDI L-2016.06 release onwards.
  - Note that this requires enabling of native dumping of PA FSDB into VERDI as described in section 4.2.1 of CHI UVM user guide.
  - The following are the metrics supported: Latency and band width metrics for CHI transactions
    - chi_cinst_request_read_bus_bandwidth_percentage
    - chi_cinst_request_read_bus_bandwidth
    - chi_cinst_request_read_byte_count
    - chi_cinst_request_read_count
    - chi_cinst_request_read_percentage
    - chi_cinst_request_write_bus_bandwidth_percentage
    - chi_cinst_request_write_bus_bandwidth
    - chi_cinst_request_write_byte_count
    - chi_cinst_request_write_count
    - chi_cinst_request_write_percentage
    - chi_ctrans_avg_request_read_latency
    - chi_ctrans_avg_request_write_latency
    - chi_ctrans_max_request_read_latency
    - chi_ctrans_max_request_write_latency
    - chi_ctrans_min_request_read_latency
    - chi_ctrans_min_request_write_latency
    - chi_ctrans_request_read_byte_count
    - chi_ctrans_request_read_count
    - chi_ctrans_request_write_byte_count
    - chi_ctrans_request_write_count
    - chi_trans_CleanInvalid_latency
    - chi_trans_CleanShared_latency
    - chi_trans_CleanUnique_latency
    - chi_trans_ECBarrier_latency
    - chi_trans_EOBarrier_latency
    - chi_trans_Evict_latency
    - chi_trans_MakeInvalid_latency
    - chi_trans_MakeUnique_latency
    - chi_trans_ReadClean_latency
    - chi_trans_ReadNoSnp_latency
    - chi_trans_ReadOnce_latency

- chi_trans_ReadShared_latency
- chi_trans_ReadUnique_latency
- chi_trans_request_read_byte_count
- chi_trans_request_read_latency
- chi_trans_request_write_byte_count
- chi_trans_request_write_latency
- chi_trans_WriteBackFull_latency
- chi_trans_WriteBackPtl_latency
- chi_trans_WriteCleanFull_latency
- chi_trans_WriteCleanPtl_latency
- chi_trans_WriteEvictFull_latency
- chi_trans_WriteNoSnpFull_latency
- chi_trans_WriteNoSnpPtl_latency
- chi_trans_WriteUniqueFull_latency
- chi_trans_WriteUniquePtl_latency

- Bug fixes

7.10.42 Notes for Release L-2016.03-1-T0314

The following changes have been made for this release:

- Native FSDB support for VERDI protocol analyzer
- The following attributes are added: See the HTML class reference for more details.
  - svt_chi_system_configuration::pa_format_type
- Bug fixes

7.10.43 Notes for Release K-2015.12-2-T0122

- VMM updates:
  - Added virtual scenarios for CHI protocol flow control features. Refer to VMM user guide and HTML class reference for details.
- UVM: SN agent, VMM: SN group:
  - Added support for trace files generation based on svt_chi_node_configuration::enable_pl_tracing, svt_chi_node_configuration::enable_pl_reporting
- Support for CHI system level performance metrics: Supported only for UVM
  - Refer to CHI SVT UVM user guide section 3.11 for more details on this
- The following new class is added: Refer to HTML class reference for more details
  - svt_chi_system_status
- The following attributes are added: Refer to HTML class reference for more details
  - `svt_chi_system_configuration::perf_tracking_enable`
  - `svt_chi_system_configuration::display_perf_summary_report`

- `svt_chi_system_configuration::slave_xact_to_rn_xact_correlation_enable`
- `svt_chi_system_env::shared_system_status of type svt_chi_system_status`

- UVM: RN and SN agents; VMM: RN, and SN groups:
  - Added support for trace files generation based on `svt_chi_node_configuration::enable_ll_tracing`, `svt_chi_node_configuration::enable_ll_reporting`
- Bug fixes

7.10.44 Notes for Release K-2015.09-1-T0923

- VMM updates:
  - Added controls for sequential addressing mode: start address and end address to single node virtual scenarios. Refer to VMM user guide and HTML class reference for details.
- Added following attributes:
  - svt_chi_system_configuration::enable_summary_reporting
  - svt_chi_system_configuration::enable_summary_tracing
- Debug features:
  - System monitor:
    Support for CHI system monitor to interactively print the following aspects to log file based on svt_chi_system_configuration::enable_summary_reporting, and interactively route to separate files based on svt_chi_system_configuration::enable_summary_tracing
    - Coherent and snoop transaction summary
    - CHI SN transaction summary
    - AXI slave transaction summary : supported only for UVM
    - Enhanced the contents of coherent and snoop transaction summary to add more relevant information
- UVM: RN agent, VMM: RN group:
  - Enhanced the content of trace files to add more relevant information and fixed existing issues for Transaction, Snoop transaction, Flit tracing and reporting based on `svt_chi_node_configuration::enable_pl_tracing`, `svt_chi_node_configuration::enable_pl_reporting`

For more details on these debug features, refer to HTML class reference and user guide.

7.10.45 Notes for Release J-2014.12-SP2-1-T0703

This release consists of the following changes:

- Updates to support Multi-clock mode with CHI interface. For more details, see the User guide and HTML class reference.
  - When a compile-time macro, namely `` `SVT_CHI_ENABLE_MULTI_CLOCK ``, is defined, `svt_chi_if` accepts array of RN clocks and SN clocks instead of a single system clock.
  - Updated CHI basic examples (UVM and VMM) to showcase this use model and the corresponding README.
- Updates to the CHI VMM flow are as follows:

- Added the following controls to the VMM system-level single node virtual scenarios. For more details, see the HTML class reference:
  - `seq_blocking_mode`
  - `seq_qos`
  - `seq_data_size`
- Added support for CHI SN memory with CHI SN group. For more details, see the HTML class reference and user guide.

Updated CHI System monitor such that the system monitor's internal system memory can be preloaded from TB provided through VMM opts.

7.10.46 Notes for Release J-2014.12-SP2-1-T0616

The following changes have been made in this release:

- Added API `svt_amba_system_configuration::set_ace_lite_to_rn_i_map` to directly connect an ACE-LITE port to the CHI system monitor.
  - DVM and Barrier transactions are currently not supported when using this API
- Added support for CHI memory within CHI SN agent
- Added attribute `svt_chi_transaction::is_read_data_unknown`
- Updated attribute `svt_chi_node_configuration::memory_update_for_read_xact_enable` to make its default value as 0
- Added `svt_chi_transaction_memory_sequence` to `svt_chi_sn_transaction_sequence_collection.sv`
- Updated the CHI system monitor check `slave_data_integrate_check` to support SN slaves
- Updated CHI transaction, snoop transaction short displays to not to print the start and end times when the transaction is not yet started
- Updated CHI system monitor summary to print SN transaction summary
- CHI system monitor data integrity checks are performed on the transactions with memory type Normal (`svt_chi_transaction::mem_attr_mem_type = NORMAL`).
- Bug fixes

7.10.47 Notes for Release J-2014.12-SP2-T0608

The following changes have been made in this release:

- A configuration attribute is added to automatically read locations that have been written into the L3 of the interconnect or main memory. Please see the class reference documentation of svt_chi_node_configuration::auto_read_seq_enable for more information.
- Added the API svt_amba_system_configuration:: set_axi_slave_to_chi_sn_map(). Please refer to amba_svt_uvm_class_reference for more information.
- When used through AMBA system environment with UVM methodology (along with including svt_amba.uvm.pkg and then importing svt_amba_uvm_pkg::*), the following features are supported by CHI system monitor. Please refer to chi_svt_uvm_class_reference for more information.

- The check svt_chi_system_err_check::slave_transaction_routing_check is enhanced such that this check is performed on the AXI slave transaction from the AXI slaves that are mapped to CHI SN nodes through the API svt_amba_system_configuration:: set_axi_slave_to_chi_sn_map()
- The check svt_chi_system_err_check::slave_data_integrity_check is added such that the data of AXI slave transaction is compared with memory of AXI slaves that are mapped to CHI SN nodes through the API svt_amba_system_configuration:: set_axi_slave_to_chi_sn_map()

- Bug fixes

7.10.48 Notes for Release J-2014.12-SP2-T0518

The following changes have been made in this release:

- Support for 3 SN-F striping feature. For more details, refer to the section 3 SN-F striping of User Guide:
  - Added the following attributes to svt_chi_system_configuration:
    - three_sn_f_striping_enable
    - three_sn_f_striping_top_address_bit_0
    - three_sn_f_striping_top_address_bit_1
  - Added the following APIs to svt_chi_system_configuration:
    - is_three_sn_f_striping_enable_valid()
    - get_three_sn_f_striping_addressable_space()
    - get_three_sn_f_striping_based_sn_f_idx()
- Bug fixes
- Note on programing HN details:
  - As demonstrated in the CHI examples, the order of programing of HN nodes should be in the following order:
    i. Programing of HN-F nodes
    ii. Programing of HN-I nodes
  - From next CHI VIP release, violation of this programing order will result in CHI system configuration's `is_valid(svt_chi_system_configuration::do_is_valid())` check to fail.

7.10.49 Notes for Release J-2014.12-SP1-2-T0422

The following changes have been made in this release:

- Added the following APIs to svt_chi_system_configuration:
  - set_mn_addr_range()
  - get_hn_addr_ranges_for_hn_type()
  - get_hn_addr_ranges_for_hn_idx()
  - get_mn_addr¬_ranges_for_mn_idx()
  - get_num_hn_nodes_for_hn_type()
  - get_active_participating_node_indices()
  - get_hn_node_indices_of_hn_type()

- Added the following controls to single node coherent virtual sequences:
  - start_addr
  - end_addr
  - hn_index
- The CHI VIP expects one to one correspondence between number of HNs (through `svt_chi_system_configuration::num_hn`) and HN interface types programmed (through `svt_chi_system_configuration::set_hn_interface_type()`). It is required to program the HN interface types using `svt_chi_system_configuration::set_hn_interface_type()` for all HNs present in the system (`svt_chi_system_configuration::num_hn`) appropriately. Else, the CHI system configuration will be considered as invalid and the simulation fails. Note that this is needed irrespective of whether VIP interconnect is enabled or not (`svt_chi_system_configuration::use_interconnect`). For more information, refer to `tb_chi_svt_uvm_intermediate_sys/env/cust_svt_amba_system_configuration.sv` for example on how to program HN interface type.

  The code snippet is as shown below.

  If `svt_chi_system_configuration` is extended in the user testbench to program relevant fields, following is the usage example:

```
cust_svt_chi_system_configuration extends svt_chi_system_configuration;
---

/** Local Variable used to program HN interface types */
svt_chi_address_configuration::hn_interface_type_enum hn_interface_type[];

----
num_hn = 9;  // Total number of HNs are 9

  /** Program the node IDs for each of the HN indices */
  ---
  ---

   /** Program the HN interface types for each of the HN indices
     *   HN index 0 to 7 correspond to HN-F
     *   HN index 8 corresponds to HN-I
     */
   hn_interface_type = new[num_hn];
   hn_interface_type[0] = svt_chi_address_configuration::HN_F;
   hn_interface_type[1] = svt_chi_address_configuration::HN_F;
   hn_interface_type[2] = svt_chi_address_configuration::HN_F;
   hn_interface_type[3] = svt_chi_address_configuration::HN_F;
   hn_interface_type[4] = svt_chi_address_configuration::HN_F;
   hn_interface_type[5] = svt_chi_address_configuration::HN_F;
   hn_interface_type[6] = svt_chi_address_configuration::HN_F;
   hn_interface_type[7] = svt_chi_address_configuration::HN_F;
   hn_interface_type[8] = svt_chi_address_configuration::HN_I;
   set_hn_interface_type(hn_interface_type);

  ----
endclass
```

If the svt_amba_system_configuration is extended in the user testbench to program relevant fields, the following is the usage example. Here <chi_sys_cfg> corresponds to CHI system configuration handle within amba system configuration:

```
cust_svt_amba_system_configuration extends svt_amba_system_configuration;
----

/** Local Variable used to program HN interface types */
svt_chi_address_configuration::hn_interface_type_enum hn_interface_type[];

----
<chi_sys_cfg>.num_hn = 9;  // Total number of HNs are 9

  /** Program the node IDs for each of the HN indices */
  ---
  ---

   /** Program the HN interface types for each of the HN indices
     *   HN index 0 to 7 correspond to HN-F
     *   HN index 8 corresponds to HN-I
     */
   hn_interface_type = new[<chi_sys_cfg>.num_hn];
   hn_interface_type[0] = svt_chi_address_configuration::HN_F;
   hn_interface_type[1] = svt_chi_address_configuration::HN_F;
   hn_interface_type[2] = svt_chi_address_configuration::HN_F;
   hn_interface_type[3] = svt_chi_address_configuration::HN_F;
   hn_interface_type[4] = svt_chi_address_configuration::HN_F;
   hn_interface_type[5] = svt_chi_address_configuration::HN_F;
   hn_interface_type[6] = svt_chi_address_configuration::HN_F;
   hn_interface_type[7] = svt_chi_address_configuration::HN_F;
   hn_interface_type[8] = svt_chi_address_configuration::HN_I;
   <chi_sys_cfg>.set_hn_interface_type(hn_interface_type);

  ----
endclass
```

For more information on this feature, see the section "*Programming CHI System Address Ranges and Related Settings*" in Synopsys VC Verification IP AMBA CHI UVM User Guide.

7.10.50 Notes for Release J-2014.12-SP1-T0223

- Added the following member attributes to svt_chi_system_configuration. These are used by the CHI system virtual sequences. Refer to the HTML class reference for more details.
  - svt_chi_system_configuration::participating_rn_nodes
  - svt_chi_system_configuration::participating_sn_nodes
- Added the following APIs to svt_chi_rn_transaction. Refer to the HTML class reference for more details.
  - svt_chi_rn_transaction::wait_for_tx_compack_prereqs()
  - svt_chi_rn_transaction::wait_for_tx_data_prereqs()
- STAR fixes

7.10.51 Notes for Release J-2014.12-T1201

- Added the following `svt_axi_cache::backdoor_write` API to support backdoor access to cache while simulation is running:

```
function bit svt_axi_cache::backdoor_write (int index,
                                            addr_t addr,
                                            bit [7:0] data[],
                                            bit byteen[],
                                            int is_unique,
                                            int is_clean,
                                       longint age);
```

- Added support for the `svt_chi_node_configuration::update_cache_for_prot_type` class.

  For more information, see the HTML class reference.
- STAR fixes

7.10.52 Notes for Release J-2014.12-T1114

- Added support for following delays:
  - svt_chi_common_transaction:: txreqflitv_delay[]
  - svt_chi_common_transaction::txdatflitv_delay[]
  - svt_chi_common_transaction::txrspflitv_delay[]
- Added support for UVM 1.2
- Added FSDB dumping code for VCS in all VIP examples
- STAR fixes

7.10.53 Notes for Release 2.92a

There are no new features for this CHI release.

7.10.54 Notes for Release 2.90a

- Added CHI VMM scenarios in the VIP.
- Added support in the `svt_chi_common_transaction` class for extracting timing information for CHI Flits. Following are the newly added APIs:
  - `svt_chi_common_transaction::get_req_timing_info()`
  - `svt_chi_common_transaction::get_snp_timing_info()`
  - `svt_chi_common_transaction::get_dat_timing_info()`
  - `svt_chi_common_transaction::get_tx_rsp_timing_info()`
  - `svt_chi_common_transaction::get_rx_rsp_timing_info()`

7.10.55 Notes for Release 2.88a

Support for dynamic reset.

7.10.56 Notes for Release 2.86a

Support for additional CHI Random sequences.

7.10.57 Notes for Release 2.81a

There are no new features for this CHI release.

7.10.58 Notes for Release 2.73a

There are no new features for this CHI release.

7.10.59 Notes for Release 2.72a

- Support for CHI VMM flow
  - RN group (Passive mode)
  - SN group (Passive mode)
  - Coherent transactions support are as follows:
    - `ReadOnce`
    - `ReadShared`
    - `WriteBackFull`
    - `ReadClean`
    - `ReadUnique`
    - `CleanUnique`
    - `MakeUnique`
    - `WriteBackPtl`
    - `WriteCleanFull`
    - `WriteCleanPtl`
    - `CleanShared`
    - `CleanInvalid`
    - `MakeInvalid`

Support for System Monitor

7.10.60 Notes for Release 2.67a

- Support for CHI VMM flow
  - RN group (Passive mode)
  - SN group (Passive mode)
  - Coherent transactions support
    - ReadOnce
    - ReadShared
    - WriteBackFull
    - ReadClean
    - ReadUnique
    - CleanUnique
    - MakeUnique
  - System Monitor

7.10.61 Notes for Release 2.66a

- Added support for CHI version 5. Following members are added to support this features:
  - `svt_chi_system_configuration::chi_version`
  - `svt_chi_node_configuration::req_flit_rsvdc_width`
  - `svt_chi_node_configuration::dat_flit_rsvdc_width`
  - `svt_chi_node_configuration::other_initial_cache_state_enable`

Added support for IUS simulator

7.10.62 Notes for Release 2.53a

There are no new features for this CHI release.

Note
STAR fixes for AXI.
For more details, see AMBA SVT Release Notes.

7.10.63 Notes for Release 2.49a

- Support for L3 cache in CHI Interconnect model. Following system configuration method has been added:
  - `svt_chi_system_configuration::set_hn_interface_type()`
  - `svt_chi_system_configuration::set_hn_num_cache_lines()`

For more details, see CHI User Guide and Class Reference HTML Manual. CHI UVM Intermediate example demonstrates the usage of above methods.

7.10.64 Notes for Release 2.46a

STAR Fixes.

7.10.65 Notes for Release 2.39a

- Licensing updates for the CHI SVT is added. It includes new license features, VIP-AMBA5-CHI-SVT and VIP-AMBA5-CHI-BETA-SVT.

  For more information, see the “Licensing Information” section in Chapter 2, “Installation and Setup", in the *Synopsys Discovery Verification IP for CHI UVM User Manual*.
- Connecting the ACE-Lite master to the CHI Interconnect VIP through bridge sequence is supported.

7.10.66 Notes for Release 2.36a

- CHI interconnect is supported in UVM.
- Connecting the AXI 3/4 Slave to the CHI Interconnect VIP through bridge sequence is supported.

7.10.67 Notes for Release 2.35a

- L-Credit related delays are supported. Refer to CHI Class Reference HTML Manual and CHI User Guide for details.
- Reordering of DAT, RSP flits is supported by active RN agent. Refer to CHI Class Reference HTML Manual and CHI User Guide for details.

7.10.68 Notes for Release 2.27a

Member `svt_chi_node_configuration::data_format` has been added to specify the format of data and byte enables in a transaction. Correspondingly a new member has been added in the transaction class: `svt_chi_transaction::transfer_length`. Refer to CHI Class Reference HTML Manual and CHI User Guide for details.

7.10.69 Notes for Release 2.26a

There are no new features for this release.

7.10.70 Notes for Release 2.25a

- The support for UVM Mantis 3586 fixes has been added which enables VIPs for pipelined protocols to work correctly without using the UVM_DISABLE_AUTO_ITEM_RECORDING macro.
- The sequences have been updated to enable FIFO type memory, when FIXED type bursts are used in AXI.

7.10.71 Notes for Release 2.16a

There are no new features for this release.

7.10.72 Notes for Release 2.15a

- The capability to generate and receive all the valid values of RespErr on all applicable flits has been added.
- The functionality of providing data for device type memory transactions with configuration parameter wysiwyg_enable set to 0 has been updated.
- Barrier sequences have been added.

7.10.73 Notes for Release 2.14a

- Support has been added for the following functionality features of CHI VIP:
  - Protocol features
    - Support to drive DBID to ZERO has been added. New members svt_chi_transaction::dbid_policy and svt_chi_snoop_transaction::dbid_policy have been added to support this feature. Refer to CHI Class Reference HTML Manual for details.
  - Verification features
    - DVM sequence has been added in the sequence collection. Refer to CHI Class Reference HTML Manual for details.

7.10.74 Notes for Release 2.13a

- Support has been added for the following functionality features of CHI VIP:
  - Protocol features
    - The svt_chi_transaction::dat_rsvdc and svt_chi_snoop_transaction::dat_rsvdc fields have been enhanced to support different values for each data flit.
  - Verification features
    - Support for link layer activation/deactivation through service transactions has been added. The svt_chi_link_service class has been added to support this feature. Refer to CHI Class Reference HTML Manual for details.
    - State and toggle coverage has been added. Refer to CHI Class Reference HTML Manual for details.

7.10.75 Notes for Release 2.12a

- Support has been added for the following functionality features of CHI VIP:
  - Protocol features
    - Support for Request Ordering
  - Verification features
    - Configurability to specify data in the transaction in a right aligned format.

      User can specify data in the svt_chi_transaction::data member in a right aligned format. Before driving the data, VIP would align the data on the appropriate byte lanes on data bus based on the address. Similarly, after sampling data from the appropriate byte lanes on data bus based on address, VIP would right align the sampled data, before populating it into the svt_chi_transaction::data member. The svt_chi_node_configuration::wysiwyg_enable member enables this configurability.

7.10.76 Notes for Release 2.11a

There are no new features for this release.

7.10.77 Notes for Release 2.10a

- Support has been added for the following functionality features of CHI VIP:
  - Protocol features
    - Support for Cache Maintenance transactions
  - Verification Features
    - Support for AMBA-PV (Programmer's View) Extensions to TLM 2.0 has been added for CHI. For details, refer to CHI UVM Class Reference Manual and section "Support for TLM Generic Payload" in CHI UVM User Guide.
    - Support for sequence collection has been added. Refer to CHI Class Reference HTML Manual for list of sequences.
    - Support for delays has been added. The following members have been added for delays:

      - svt_chi_node_configuration::**delays_enable**

      - svt_chi_flit::**tx_flit_delay**

      - svt_chi_flit::**tx_flitpend_flitv_delay**

      Refer to CHI Class Reference HTML Manual for details.
  - Examples
    - CHI UVM Intermediate example tb_chi_svt_uvm_intermediate_sys has been added. Refer to CHI UVM User Guide for more details on the example.

7.10.78 Notes for Release 2.05a

There are no new features for this release.

7.10.79 Notes for Release 2.03a

- Support has been added for constraints and randomization for the following non-coherent transactions:
  - ReadNoSnoop
  - WriteNoSnoopFull
  - WriteNoSnoopPtl

7.10.80 Notes for Release 2.02a

- This release supports the following basic functionality features of CHI VIP:
  - Protocol features
    - Write-type transactions (WriteUnique[Full, Ptl])
    - Barrier transactions
    - DVM transactions
  - Verification Features
    - Cache state transition coverage
  - Methodology features
    - System level checks
      - Hazard checks
      - DVM checks

7.10.81 Notes for Release 2.01a

- Support for Data Integrity system checks has been added.

7.10.82 Notes for Release 2.00a

- This release supports the following basic functionality features of CHI VIP:
  - Protocol features
    - Support for RN-F, RN-I and SN-F node types
    - Support for ReadNoSnp, WriteNoSnpPtl and WriteNoSnpFull transaction types
    - Read-type transactions
    - CopyBack transactions
    - Byte Enables and data transfer sizes
    - Protocol credit return
    - Snoop request and response messages
    - Cache state transitions at requesting RN-F
    - Transaction ID (TxnID) and Data buffer ID (DBID)
    - Request Retry
    - Quality of Service
    - Protocol and Link Flits
    - Virtual channels:
      - Request VC
      - Response VC
      - Snoop VC
      - Data VC
    - Link layer Flow control
    - Link activation/de-activation
    - LINKACTIVE State Machine

- SACTIVE signal
- Data beat ordering

- Verification Features
  - Transaction coverage
  - Verification Plan
  - Protocol Analyzer
- Methodology features
  - Active and Passive mode of RN and SN agents
  - RN and SN agents support analysis ports in active and passive mode
  - Port and System level checks
  - Bind Interface
  - Callbacks

- Backward compatibility issues with respect to 1.98a release:
  - Signal name "reset" in svt_chi_if, svt_chi_rn_if and svt_chi_sn_if interfaces has been renamed to "resetn", to reflect the active low nature of the signal.

Note
Refer to "Known Issues and Limitations" section for the list of features not yet supported by CHI VIP.

7.10.83 Notes for Release 1.99a

There are no new features for this release.

7.10.84 Notes for Release 1.98a

- Support has been added for the following basic functionality features of CHI VIP:
  - Protocol features
    - Support for RN-F and SN-F node types
    - Support for ReadNoSnp, WriteNoSnpPtl and WriteNoSnpFull transaction types
    - Byte Enables and data transfer sizes
    - Transaction ID (TxnID) and Data buffer ID (DBID)
    - Protocol and Link Flits
    - Virtual channels:
      - Request VC
      - Response VC
      - Data VC
    - Link layer Flow control
    - Link activation
    - LINKACTIVE State Machine
    - SACTIVE signal
    - Data beat ordering

- Methodology features
  - Active and Passive mode of RN and SN agents
  - RN and SN agents support analysis ports in active and passive mode

- CHI VIP User Guide has been provided as part of the documentation set.
- Backward compatibility issues with respect to 1.97a release:
  - Signal names in svt_chi_rn_if and svt_chi_sn_if interfaces have undergone one change since the previous release. The string "DATA" in all signal names has been replaced with the string "DAT" to be more consistent with the specification.
  - Argument type for the following method has been changed from type integer to type integer array:

    svt_chi_system_configuration::set_hn_node_id (int node_id [])

Note

Refer to "Known Issues and Limitations" section for the list of features not yet supported by CHI VIP.

7.10.85 Notes for Release 1.97a

- In this release, support for CHI VIP has been added. This is a compile-only release, which can be used for integrating the VIP in user environment, and studying the user interface. There is no functionality added to CHI VIP yet. The following components are a part of this release:
  - svt_chi_system_env
  - svt_chi_rn_agent
  - svt_chi_sn_agent

  The svt_chi_system_env component contains the following two agents:
  - svt_chi_rn_agent
  - svt_chi_sn_agent

  The svt_chi_system_env is contained within svt_amba_system_env.

  Refer to CHI Class Reference HTML Manual for user interface details.

Note

The user interface, specifically the fields of configuration and transaction classes may undergo change as the CHI VIP evolves. These changes may not be backward compatible, at least till the first functional release.