See all versions of this document

Xilinx Runtime (XRT) Release Notes

UG1451 (v2021.1) June 24, 2021

XILINX

Revision History

The following table shows the revision history for this document.

Section	Revision Summary
06/24/2021 Version 2021.1	
XRT Operating System Support	Updated supported operating systems. Added section for operating system end-of-life support.
Software Component Versions	Updated detailed release information.
New Features	New API. Greatly improved next generation xbutil and xbmgmt utilities are now the default.
Major Changes	Deprecated APIs.
Known Issues	Issues with `xbutil`.
04/07/2021 Version 2020.2 PU1	
XRT Operating System Support	Removed kernel versions. Clarified notes regarding CentOS versions.
Major Changes	Updated content regarding xbutil validation failures and bug fixes.
Known Issues	Solution provided for soft lockup on Alveo™ U250 Data Center acceleration cards when running PCIe® P2P configuration with host_mem enabled.
02/01/2021 Version 2020.2	
XRT Operating System Support	Updated support for RHEL/CentOS v8.1 and v8.2. Added Virtualization Support information.
Software Component Versions	Updated build version and Git Hash for Alveo™ cards, and GitHub Tag.
New Features	Updated platform support. Updated Slave bridge and DDR retention features.
11/24/2020 Version 2020.2	
XRT Operating System Support	Updated OS Support.
Software Component Versions	Updated with new content.
Chapter 2: What's New	Updated with new content.
New Features	Updated with new content.
Major Changes	Updated with new content.
Known Issues	Updated link to known issues answer record.
08/20/2020 Version 2020.1 PU1	
XRT Operating System Support	Added new topics describing OS support.
Software Component Versions	Updated with 2020.1 PU1 values.
New Features	Updated with new content.
Resolved Issues	Updated with new content.
Known Issues	Updated with new issue and updated link for the Answer Record.

Section	Revision Summary
References	Updated with new referential documents.
06/03/2020 Version 2020.1	
Initial release.	N/A

Table of Contents

Chapter 1

About Xilinx Runtime (XRT)

Xilinx® Runtime library (XRT) facilitates communication between your application code (running on an embedded Arm® or x86 Host) and the accelerators deployed on the reconfigurable portion of PCIe®-based Xilinx accelerator cards, Zynq® UltraScale+™ MPSoC-based embedded platforms, or ACAPs.

XRT is an open source project. Its source code is hosted at https://github.com/Xilinx/xrt, and its documentation is located at https://xilinx.github.io/XRT/.

Using XRT with the Vitis™ unified software platform is documented in Vitis Accelerated Software Development Flow Documentation in the Application Acceleration Development flow of the *Vitis Unified Software Platform Documentation* (UG1416).

XRT Operating System Support

Operating System[1]	Architecture	Version
RHEL/CentOS	x86_64	7.6, 7.7, 7.8
		8.1, 8.2
RHEL	x86_64	8.3
Ubuntu[2]	x86_64	16.04.5 LTS, 16.04.6 LTS
		18.04.1 LTS, 18.04.2 LTS, 18.04.4 LTS[3], 18.04.5 LTS
		20.04 LTS, 20.04.1 LTS
PetaLinux	aarch64, cortexa9	2021.1

Notes:

1. All supported Operating Systems are tested with general access versions (GA). Ubuntu Hardware Enablement (HWE) is not supported.
2. Ubuntu Live Patch Service might apply kernel patches automatically. XRT is not tested against live patches. To prevent compatibility issues, turn off kernel auto-upgrade.
3. Ubuntu 18.04.4 Desktop version enables HWE by default, but the server version does not.
   For version details, refer to the Ubuntu website.

***Note*:** During installation, the kernel-headers package is required. CentOS only provides the kernel-headers package for some releases. XRT only supports CentOS OS versions that provide kernel-headers packages.

***Note*:** For details about Xilinx tested OS versions tested by Xilinx and their kernel versions, see Xilinx Answer Record 76567.

Virtualization Support

XRT can be used in the KVM virtualization environment as the guest with all the operating systems listed in the previous table.

Operating System End-of-Life Support Notification

Due to the end of support from OS vendors, XRT 2021.2 will end support for the following versions.

Table 1: **Last Supported Versions**

Operating System	Version
RHEL/CentOS	7.6, 7.7
Ubuntu	16.04.5 LTS, 16.04.6 LTS
	18.04.1 LTS, 18.04.2 LTS, 18.04.3 LTS

Software Component Versions

Component	Version
Release Name	2021.1
XRT Build Version for Alveo	2.11.634
XRT Git Hash for Alveo	5ad5998d67080f00bca5bf15b3838cf35e0a7b26
XRT GitHub Tag	202110.2.11.634
XRT Git Hash for PetaLinux	0dc9f505a3a910dea96166db7b5df8530b9ae38e
XRT GitHub Tag	202110.2.11.0_PetaLinux

What's New

New Features

This version of Xilinx® Runtime (XRT) includes the following new features.

- **New API:**
  - Stable native XRT API, with C++ APIs for AI Engine graph control and execution, Software Emulation and tracing support.
  - XRT provides new helper APIs to help users to move from OpenCL API to XRT native API in `$XILINX_XRT/include/CL/cl2xrt.hpp`.
  - XRT New API—`xrt::device.get_info()` can extract device properties

  Note: For detailed info about XRT API changes and experimental features, refer to the changelog.

- **Greatly improved next generation `xbutil` and `xbmgmt` utilities are now the default:**
  - When users execute the old command, the following message is displayed:

    ```
    The given legacy sub-command and/or option has been deprecated to be
    obsoleted in the next release.
    Further information regarding the legacy deprecated sub-commands and
    options along with their mappings to the next generation.
    sub-commands and options can be found on the Xilinx Runtime (XRT)
    documentation page:
    https://xilinx.github.io/XRT/master/html/xbtools_map.html
    Please update your scripts and tools to use the next generation sub-
    commands and options.
    ```

  - `xbutil` can report power status
  - `xbmgmt` can support runtime clk scale and set up user power threshold to protect board and server.
  - `sysfs`, `xbmgmt`. and `xbutil` can report MAC address of Alveo board

- **KDS scheduler in xocl:** Refactored to significantly improve the throughput across hundreds of processes exercising multiple compute units across multiple devices concurrently. For legacy shells, you might notice a small percentage of throughput degradation. To resolve this issue, see Xilinx Answer Record 76556.

- **XRT driver debug trace support:** Through `debugfs /sys/kernel/debug/xclmgmt/` and `/sys/kernel/debug/xocl/`.

Major Changes

- XRT streaming APIs used with QDMA PCIe® DMA engine have been deprecated. They will be removed in a future release.
- HAL APIs prefixed with *xcl* have been deprecated from python bindings. They will be removed in a future release. Users should move to APIs prefixed with *xrt* or pybind11 based APIs.

Known Issues

For up-to-date information about known issues, refer to Xilinx Answer Record 76544.

Table 2: **Known Issues and Solutions**

Issue Description	Solution
`xbutil` validate sometimes prints unsupported test cases.	If it has no test results, ignore the test names.
The following show deprecated messages • `xbutil --version` • `xbmgmt --version`	

XILINX

Appendix A

Additional Resources and Legal Notices

Xilinx Resources

For support resources such as Answers, Documentation, Downloads, and Forums, see Xilinx Support.

References

The following documents provide useful, supplemental material.

- Xilinx XRT Portal
- XRT source code on GitHub
- XRT Documentation
- *Vitis Unified Software Platform Documentation* (UG1416)
- Comprehensive Release Notes and Known Issues Xilinx Answer Record 71628

Please Read: Important Legal Notices

Materials), including for any direct, indirect, special, incidental, or consequential loss or damage (including loss of data, profits, goodwill, or any type of loss or damage suffered as a result of any action brought by a third party) even if such damage or loss was reasonably foreseeable or Xilinx had been advised of the possibility of the same. Xilinx assumes no obligation to correct any errors contained in the Materials or to notify you of updates to the Materials or to product specifications. You may not reproduce, modify, distribute, or publicly display the Materials without prior written consent. Certain products are subject to the terms and conditions of Xilinx's limited warranty, please refer to Xilinx's Terms of Sale which can be viewed at https://www.xilinx.com/legal.htm#tos; IP cores may be subject to warranty and support terms contained in a license issued to you by Xilinx. Xilinx products are not designed or intended to be fail-safe or for use in any application requiring fail-safe performance; you assume sole risk and liability for use of Xilinx products in such critical applications, please refer to Xilinx's Terms of Sale which can be viewed at https://www.xilinx.com/legal.htm#tos.

AUTOMOTIVE APPLICATIONS DISCLAIMER

AUTOMOTIVE PRODUCTS (IDENTIFIED AS "XA" IN THE PART NUMBER) ARE NOT WARRANTED FOR USE IN THE DEPLOYMENT OF AIRBAGS OR FOR USE IN APPLICATIONS THAT AFFECT CONTROL OF A VEHICLE ("SAFETY APPLICATION") UNLESS THERE IS A SAFETY CONCEPT OR REDUNDANCY FEATURE CONSISTENT WITH THE ISO 26262 AUTOMOTIVE SAFETY STANDARD ("SAFETY DESIGN"). CUSTOMER SHALL, PRIOR TO USING OR DISTRIBUTING ANY SYSTEMS THAT INCORPORATE PRODUCTS, THOROUGHLY TEST SUCH SYSTEMS FOR SAFETY PURPOSES. USE OF PRODUCTS IN A SAFETY APPLICATION WITHOUT A SAFETY DESIGN IS FULLY AT THE RISK OF CUSTOMER, SUBJECT ONLY TO APPLICABLE LAWS AND REGULATIONS GOVERNING LIMITATIONS ON PRODUCT LIABILITY.

Copyright