

# RTX vs RTX64

## COMPARISON GUIDE

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**IntervalZero**

**RTX**

**RTX64**

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Comparison Guide: RTX vs RTX64

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# About this Guide

The purpose of this Comparison Guide is to highlight the major differences between RTX64 4.0 and RTX 2016. It contains information on default program setup and functionality.

# 1

## Functionality

This chapter describes the similarities and differences in functionality between RTX and RTX64.

### Operating System Support for Runtime

Feature	RTX 2016	RTX64 4.0	Notes
Windows 10	No	Yes	Support for May Update Version 1903 was added in RTX64 3.7  <b>NOTE:</b> See the Web page <a href="#">RTX64 Support for Windows 10 Updates</a> for an outline of supported Windows 10 Updates.
Windows 8.1 with Update	No	No	
Windows 7 SP1	Yes (32-bit)	No	For RTX 2016, you must have the latest update installed to support the Windows security updates released after March 2018.
Windows Vista SP2	No	No	
Windows XP SP3	No	No	

# Microsoft Visual Studio Support

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Visual Studio 2019	No	Yes	Support was added in RTX64 3.7
Visual Studio 2017	No	Yes (UP8)	
Visual Studio 2015	Yes (UP1)	Deprecated	RTX64: Visual Studio 2015 is deprecated and will be removed from a future release. Existing projects should work. You can create new projects.
Visual Studio 2013	Yes	Deprecated	RTX, RTX64: Visual Studio 2013 is not supported, however existing projects should work. You cannot create new projects or debug projects.
Visual Studio 2012	No	Deprecated	RTX, RTX64: Visual Studio 2012 is not supported, however existing projects should work. You cannot create new projects or debug projects.
Visual Studio 2010	No	No	This version is not supported, however existing projects should work. You cannot create new projects or debug projects.

## Microsoft C Runtime Support

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Visual Studio 2019	No	Yes	Support was added in RTX64 3.7
Visual Studio 2017	No	Yes	
Visual Studio 2015	Yes	Deprecated	RTX64: This version is deprecated and will be removed from a future release.
Visual Studio 2013	Yes (UP1)	No	RTX, RTX64: This version is not supported but should still work.
Visual Studio 2012	No	No	RTX, RTX64: This version is not supported but should still work.
Visual Studio 2010	No	No	This version is not supported but should work with RTX64.

## Microsoft User Group Support

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Users	Yes	Yes	
Administrators	Yes	Yes	

## Device Support

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
ISA-based Device Support	Yes	No	

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
PCI-based Device Support	Yes	Yes	Both products support Line-based, MSI and MSI-X.  RTX64 supports multiple vector interrupts for MSI-X.

## Real-Time Subsystem

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Shared Mode	No	No	The concept of a Shared mode is no longer supported as of RTX 2016.
Dedicated Mode	Yes (32 total, 31 maximum RTSS processors)	Yes (64 total, 63 maximum RTSS processors)	In RTX, you can assign a maximum of 4 processors to Windows on clustered systems. There is no such limitation in RTX64.
Thread Priority Levels	128	128	Available priorities are 0 to 127.
RTSS DLLs	Yes	No	
RTDLLs	Yes (explicit)	Yes (explicit and implicit)	In RTX64, RTDLLs are private data. In RTX, RTDLLs are public data.
Image Loader	Windows (RTSS for debugging)	RTSS	You do not need to register RTDLLs in RTX64.



<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Automatic Subsystem start	Yes	Yes	RTX64 supports automatic starting. RTSS applications can be scheduled to start with the Subsystem using the Scheduled Tasks feature in the RTX64 Task Manager.
Local Memory	Yes	Yes	Local memory was re-architected for RTX64 4.0. See the Help for more information.
Structured Exception Handling	Yes	Yes	
MMX/SSE/SSE2/SSE3/SSE4/AVX support	Yes	Yes (AVX-512)	
Priority Inversion protection	Yes	Yes	RTX64 does not support limited demotion.
Internal Tracing	Yes	Yes	Implementation of tracing is different between RTX and RTX64.
Shutdown Handling	Yes	Yes	RTX64 implements shutdown handling differently from RTX, so handlers may not be called at the same point in the shutdown sequence as in RTX.
Starvation/Watchdog Timer	Yes	Yes	The RTX64 SDK includes a Real-time RtResetWatchdog function which resets the watchdog timer counter on the specified RTSS core(s).

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
RTAPI support for Windows Native applications	Yes (32-bit)	Yes (32-bit and 64-bit)	
RTAPI support for Windows Managed applications	Yes	Yes	
Real-Time Kernel (RTK) support	Yes	Yes	
WinDbg Debugging support	Yes	Yes	The RTX64 WinDbg Extension requires the 64-bit version of WinDbg, whereas RTX supports the 32-bit version. RTX64 also has additional commands to provide loaded modules and other functionality.
Performance optimization with Intel® Resource Director Technology (RDT)	No	Yes	RTX64 provides a <i>Priority-based CLOS performance</i> mode for Cache Allocation Technology (CAT) and Memory Bandwidth Allocation (MBA), and the ability to disable the Intel RDT feature altogether.

## Real-Time Network

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
RT-TCP/IP Stack	Yes (Fusion)	Yes (Treck)	Both support IPv4 and IPv6.
SMP Aware	No	Yes	
RAW Socket support	Yes	Yes	RTX64 uses socket options to create a RAW Socket.

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
MAC layer Filter support through a common interface	Yes	Yes	The Real-time network driver filter interfaces in RTX and RTX64 are different due to different stacks.
Network Interface device support through a common interface	Yes	Yes	The Real-time network driver interfaces in RTX and RTX64 are different due to different stacks.
Virtual IP	Yes (up to 32 addresses)	Yes (up to 12 addresses called multi-homing)	Support for multiple IPv4 Addresses and Netmasks for a single physical interface was added in RTX64 3.2. You can configure multiple IPv4 Address/Netmask pairings in the RTX64 Control Panel on the <i>Manage Interfaces and Filters</i> page.
Virtual Network	Yes	Yes	
RtI10GB Network Driver	No	Yes	
RtIGB Driver (Intel i210, i211, and i350)	Yes (RTX 2012 with Update 1)	Yes	
Rt82579 Network Driver (Intel 82576)	Yes	Yes	
Rt82580 Network Driver (Intel 82580)	Yes	Yes	
RTE1000 (Intel 82540/1/2/3/4/5/6/7, 82571/2/3/4)	Yes	Yes	
RtRtl81x9 Network Driver (Realtek 8139, 8100, 8169, 8110)	No	Yes	
RtRtl8168 Network Driver (Realtek 8168/8111)	Yes	Yes	Support for limited revisions only

Feature	RTX 2016	RTX64 4.0	Notes
Rt8255x Network Driver (Intel 52557/8/9/0/1, 82559)	Yes	No	
Rt82543 Network Driver	Yes	No	
RtI217 Network Driver (Intel I217LM, I217V, I218LM, I218V)	No	Yes	
RtBCM Network Driver (Broadcom NetXtreme 57762)	No	Yes	
RTX64 INTEL Peripheral Controller Hub (PCH) Driver	No	Yes	Full support was added in RTX64 3.2

For information on the tested devices supported by the drivers listed above, see the RTX/RTX64 Supported NICs documents available online at <http://www.intervalzero.com/technical-support/guides-and-minitutorials/>

## Real-Time Network Abstraction Layer (NAL)

Feature	RTX 2016	RTX64 4.0	Notes
Ethernet Layer 2 Interface	No	Yes	
Access to NIC Timestamping	No	Yes	
Access to NIC Queues	No	Yes	
NAL-specific support for common INTEL IGB, 10GB, PCH, and E1000 NICs	No	Yes	See the <i>RTX64 Supported NICs</i> document available online at <a href="http://www.intervalzero.com/technical-support/guides-and-minitutorials/">http://www.intervalzero.com/technical-support/guides-and-minitutorials/</a>

## Tools and Utilities

Feature	RTX 2016	RTX64 4.0	Notes
Subsystem Configurations	Yes	Yes	RTX is C/C++, while RTX64 supports both a native and a managed interface.

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Analyzer	Yes	Yes	The RTX64 Analyzer collects much more information than the RTX version.
RtssRun	Yes	Yes	In RTX64, only a command line version is supported. User Interface functionality is provided through the RTX64 Task Manager.
RtssKill	Yes	Yes	In RTX64, only a command line version is supported. User Interface functionality is provided through the RTX64 Task Manager.
RtssView	Yes	No	
Task Manager	Yes	Yes	The Task Manager was updated to include CPU usage information in RTX64 3.5. The Task Manager was updated to include support for Scheduled Tasks in RTX64 3.4.
System Tray	No	Yes	The RTX64 System Tray displays the current state of the Subsystem and provides links to various RTX64 tools from a right-click menu.

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Server (displays print messages)	Yes	Yes	
RT-TCP/IP Utilities (RtssArp, RtssIpConfig, RtssPing, RtssRoute)	Yes	Yes	
Activation and Configuration	Yes	Yes	The RTX64 Activation and Configuration Utility contains more functionality than the RTX version, such as the option to disable licenses.
StampTool	Yes	Yes	
Event Monitoring	Yes (TimeView)	Yes (Monitor utility)	

## Developer Tools

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
View internal objects	Yes	Yes (command line tool)	
System Response Time Measurement (SRTM)	Yes	Yes	
Kernel System Response Time Measurement (KSRTM)	Yes	Yes	
Visual Latency Tool	Yes (RTX Demo)	Yes (Latency View)	
View CPU usage	Yes (RTSS Performance View)	Yes (via RTX64 Task Manager)	
Platform Evaluator	Yes (RTX Platform Evaluator)	No	
Profiling	Yes (RTX Time View)	Yes (Tracealyzer, Monitor utility)	Percepio Tracealyzer for RTX64

# Visual Studio Developer Tools

<b>Feature</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Wizards/Templates for Creating Applications and RTDLLs	Yes	Yes	
Code Snippets	Yes	Yes	
Local Debugging	Yes	Yes	
Remote Debugging	Yes	Yes	Through launch
Attach	No	Yes	The ability to attach to a locally running RTSS process
Set main thread affinity	Yes	Yes	
Set use local memory	Yes	Yes	

# 2

## Default Subsystem Setup

### General System Settings

The table below lists default System settings for RTX and RTX64.

Setting	RTX 2016	RTX64 4.0	Notes
RTX64 Subsystem startup	Manual	Manual	You must be a member of the RTX64Administrators group to start and stop the Subsystem.
Process Slots	10	N/A	The concept of Process Slots does not exist in RTX64.
HAL Timer Period	100 microseconds	100 microseconds	
Time Quantum	0 milliseconds	0 microseconds	Threads will run to completion, or are preempted by a higher priority thread, or yield to another thread of the same priority. RTX64 has microsecond granularity.
Shutdown print handling	HANDLE_PRINT_ALWAYS	<i>Deprecated</i>	
Free stack on TerminateThread calls	Disabled	Disabled	By default, the thread stack is not released upon thread termination.



<b>Setting</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Delay full cache flush while RTSS applications are running	Enabled	<i>Deprecated</i>	
Priority Inversion Protocol	Priority promotion with tiered demotion	Priority promotion with tiered demotion	The concept of limited demotion is not applicable in RTX64.
Trace/Monitor	Enable on subsystem startup	Disabled on subsystem startup	

## RT-TCP/IP Stack Settings

The table below lists default RT-TCP/IP Stack settings for RTX and RTX64.

<b>Setting</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Maximum Sockets	30	64	
Memory Allocation	256 kilobytes	2048 kilobytes	
Stack Timer Interval	200 milliseconds	100 milliseconds	
MTU	1500 bytes	1500 bytes	

## Real-Time Network Abstraction Layer (NAL)

The RTX64 Network Abstraction Layer (NAL) add-on is a network layer that abstracts the network hardware and driver functions from the upper-level protocol stacks and provides management interfaces for those upper layers to easily query for and use available network assets. It is a separate protocol layer from the RT-TCP/IP Stack. Using the NAL, you can more easily take advantage of network functionality such as EtherCAT, TSN (Time Sensitive Networks), and PTP (Precision Time Protocol).

## Debug Support

The table below lists default Debug settings for RTX and RTX64.

<b>Setting</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Write Debug Information on System Failure	Enabled	<i>Deprecated</i>	Information is always added to the Windows memory dump file in RTX64.

## Memory Settings

The table below lists the default Memory settings for RTX and RTX64.

Setting	RTX 2016	RTX64 4.0	Notes
Local Memory Pool - Pool size	131072 bytes	4194296 bytes (Minimum size for MSpace)	Local Memory was re-architected for RTX64 4.0. See the Help for more information.
Local Memory Pool - Automatically expand local memory pool	Enabled	Enabled (Auto expand MSpaces)	Local Memory was re-architected for RTX64 4.0. See the Help for more information.
Local Memory Pool - Automatically shrink local memory pool	Not available	Enabled (Auto shrink MSpaces)	Local Memory was re-architected for RTX64 4.0. See the Help for more information.
Local Memory Pool - Expansion size	65536 bytes	4194296 bytes	Local Memory was re-architected for RTX64 4.0. See the Help for more information.
Allocation	Request from Windows	Request from Local Memory	Local Memory was re-architected for RTX64 4.0. See the Help for more information.

## Starvation Setup

The table below lists the default Starvation settings for RTX and RTX64.

Setting	RTX 2016	RTX64 4.0	Notes
Monitor for Windows starvation	Disabled	Enabled (Timeout: 5000000 us)	This is known as <b>Watchdog Timeout</b> in RTX64.

## Exceptions Settings

The table below lists the default Exceptions settings for RTX and RTX64.

<b>Setting</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
Process Exception Disposition	Terminate the faulting process	Terminate the faulting process	
Structured Exception Handling	Enabled	Enabled	In RTX64, you can no longer configure exception types individually.

## General Hardware Settings

The table below lists the default Hardware settings for RTX and RTX64.

<b>Setting</b>	<b>RTX 2016</b>	<b>RTX64 4.0</b>	<b>Notes</b>
SpeedStep®	Prevent Windows idle state	Enable Windows idle detection (disabled)	
Windows Energy/Performance Bias	N/A	Override Windows	

Setting	RTX 2016	RTX64 4.0	Notes
Optimize performance with Intel® Resource Director Technology (RDT)	N/A	Optimize performance with Intel® Resource Director Technology (RDT) enabled	<p data-bbox="1138 254 1430 359"><i>Cache Allocation Technology (CAT)</i> default mode:</p> <ul data-bbox="1170 394 1422 611" style="list-style-type: none"> <li data-bbox="1170 394 1422 611">• <i>Flat performance mode</i> – All RTSS logical processors are equally configured with all RTSS L3/L2 caches.</li> </ul> <p data-bbox="1138 646 1422 751"><i>Memory Bandwidth Allocation (MBA)</i> default mode:</p> <ul data-bbox="1170 787 1422 1003" style="list-style-type: none"> <li data-bbox="1170 787 1422 1003">• <i>Flat performance mode</i> – All RTSS cores are configured with minimum memory delay.</li> </ul> <p data-bbox="1138 1039 1430 1110"><b>NOTE:</b> This functionality is hardware-dependent.</p>

# Getting Support

IntervalZero offers a number of support options for RTX64 users, including technical support and the IntervalZero Website.

## Third-Party Support

If you are a customer who purchased an IntervalZero product through a third-party reseller, contact the reseller for support.

## Contacting Technical Support by Phone

Location	Number	Hours
United States	1-781-996-4481 At the prompt, press 3 for Support.	Monday - Friday, 8:30 a.m. – 5:30 p.m. US Eastern Time (GMT-500), excluding holidays.
R.O.C. Taiwan	+ 886-2-2556-8117	Monday - Friday, 9:00 a.m. – 5:00 p.m. Taipei Standard Time (GMT+8), excluding holidays.

## Before Calling Technical Support

Please have the following information ready before calling IntervalZero Technical Support:

- **Your Support ID:** customers who purchase direct support receive an e-mail address and password for use when accessing the IntervalZero support web site.
- **The version number of your RTX64 software:** determine the version of RTX64 installed on your system.
- **Your maintenance status:** check to make sure you have a valid maintenance contract.

## IntervalZero Website

The IntervalZero Customer Support Web page is located at:

<http://www.intervalzero.com/technical-support/>

The IntervalZero support web pages provide electronic access to the latest product releases, documentation, and release notes. With a valid e-mail address and password, you can access the online problem report database to submit new issues or to obtain the status of previously reported issues.

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