

RTX64

DEPLOYMENT GUIDE

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Deployment Guide for RTX64 4.0

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IntervalZero

400 Fifth Avenue
Fourth Floor
Waltham, MA 02451
Phone: 781-996-4481

www.intervalzero.com

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Overview

This document includes information on installing, activating and configuring RTX64, based on the common deployment scenarios described below. If the scenarios outlined in this document do not resolve your deployment requirements, contact IntervalZero Sales.

Scenario 1: End User

In this scenario, the end user installs, activates and configures RTX64.

[More information](#)

Scenario 2: Installing RTX64 Silently within Your Product

In this scenario, RTX64 is wrapped within your product installation. Installation, activation and configuration of RTX64 is done silently, but allows for your end users to uninstall RTX64 without uninstalling your product.

[More information](#)

Scenario 3: Including RTX64 Merge Modules within Your Installation

In this scenario, RTX64 features - available as Merged Modules - are included within your product installation. Activation and configuration of RTX64 is done silently after installation of your product, which includes RTX64. RTX64 can only be removed when your product is uninstalled.

[More information](#)

Scenario 4: Deploying RTX64 in an Image for Auto Activation

In this scenario, RTX64 is installed and configured for auto activation before an image is created for deployment.

[More information](#)

Scenario 5: Deploying RTX64 on Windows 10 IoT Enterprise

In this scenario, RTX64 is installed and configured on a system running Windows 10 IoT Enterprise.

[More information](#)

License Types

Below are the license types supported for RTX64 deployment. Throughout this guide, the recommended license type is listed under each scenario.

Node Locked

A node-locked license ties RTX64 to a particular system or IntervalZero-provided dongle during product activation. This license type supports:

- Single activation – a single activation key licenses a single system
- Pool activation – a single activation key licenses multiple systems

Contact IntervalZero Sales with questions regarding product licensing options: sales@intervalzero.com or (781) 996-4481.

Optimizing the Subsystem for Deployment

The tables below list recommended RTSS Subsystem configuration settings for deployment of RTX64 with your product. By default the Runtime is provided for usability and is not necessarily optimized for performance. You can configure a number of subsystem settings using the RTX64 Control Panel or programmatically using the native or managed code framework to improve subsystem and application performance.

DEPLOYING ON WINDOWS 10: For deployment systems running Windows 10, we recommend the Windows 10 Long Term Servicing Channel (LTSC) version. See the Web page [RTX64 Support for Windows 10 Updates](#) for an outline of supported Windows 10 Updates.

Subsystem Configuration Options

Change internal system behavior

Control Panel Setting	Recommended Value for Deployment
Change the HAL Timer Period	Your application's Timer Period must always be a multiple of the HAL Timer Period setting. The default HAL setting is 100.
Free the Stack on TerminateThread calls	Free the stack on TerminateThread calls
Use priority inversion	Use priority inversion (default)
Optimize performance with Intel [®] Resource Director Technology (RDT) NOTE: This functionality is hardware-dependent.	Optimize performance (enabled) <ul style="list-style-type: none">• <i>Cache Allocation Technology (CAT)</i> mode:<ul style="list-style-type: none">• <i>Flat performance mode</i> (default) – All RTSS logical processors are equally configured with all RTSS L3/L2 caches.• <i>Memory Bandwidth Allocation (MBA)</i> mode:<ul style="list-style-type: none">• <i>Flat performance mode</i> (default) – All RTSS cores are configured with minimum memory delay.

Change memory allocation behavior

Control Panel Setting	Recommended Value for Deployment
Manage Subsystem and application memory behavior: <ul style="list-style-type: none">• Use local memory (deterministic)• Use Windows memory (non-deterministic)	Use local memory (deterministic)
Zero memory on allocation	Disabled
Process memory allocation space / Minimum size for external MSpace (kilobytes)	Based on local memory usage of your application. Before deployment, you can query the local memory usage by calling RtQueryProcessMSpace .
Process memory allocation space / Auto expand MSpaces	Disabled
Process memory allocation space / Auto shrink MSpaces	Disabled
System process memory allocation space / Minimum size for internal MSpace (kilobytes)	Based on local memory usage of your application. Before deployment, you can query the local memory usage by calling RtQueryProcessMSpace .
System process memory allocation space / Minimum size for external MSpace (kilobytes)	Based on local memory usage of your application. Before deployment, you can query the local memory usage by calling RtQueryProcessMSpace .
System process memory allocation space / Commit at Subsystem startup	Disabled

Control Panel Setting	Recommended Value for Deployment
System process memory allocation space / Auto expand MSpaces	<p data-bbox="699 233 813 260">Disabled</p> <p data-bbox="699 291 1430 821">IMPORTANT! When <i>Auto expand MSpaces</i> is disabled for the Subsystem you will be responsible for configuring the amount of memory the Subsystem has for internal and external resources for the entire system. This includes Networking components (NAL and RT-TCP/IP Stack) and other tools and utilities provided with the RTX64 Runtime. If the Subsystem does not have enough available memory, real-time processes will fail to run or fail to create IPC objects with <code>ERROR_NOT_ENOUGH_MEMORY</code>. See the MiniTutorial <i>Best Practices for Disabling Auto Expand MSpaces</i> in the Help for recommendations on how to proceed with <i>Auto expand MSpaces</i> disabled.</p>
System process memory allocation space / Auto shrink MSpaces	Disabled
Network memory allocation space / Network Abstraction Layer (NAL) memory allocation space / Minimum size for MSpace (kilobytes)	Based on local memory usage of the NAL, which is dependent on the number of enabled interfaces.
Network memory allocation space / Network Abstraction Layer (NAL) memory allocation space / Commit at Subsystem startup	Disabled
Network memory allocation space / Network Abstraction Layer (NAL) memory allocation space / Auto expand MSpaces	Disabled

Control Panel Setting	Recommended Value for Deployment
TCP/IP Stack memory allocation space / Network Abstraction Layer (NAL) memory allocation space / Minimum size for MSpace (kilobytes)	<p>The minimum size of the TCP/IP Stack process's external MSpace. This value needs to be large enough to support RT-TCP/IP Stack heap allocation.</p> <p>If you are using the TCP/IP Stack with the Virtual Network, you should use the following formula to determine the amount of memory you need to allocate:</p> <p>Minimum=1.5*(([50] _k+(8_k*(numEnabledInterfaces-1)))+([150] _k*((numEnabledInterfaces+1)/2))+(400*numSockets))</p> <p>In this calculation:</p> <ul style="list-style-type: none"> • The first interface is 50k; each additional interface is 8k • 150k is the size of a connection; the number of (interfaces+1)/2 is intended to round out the estimate of the total connection size • 400 is the size of a socket • The entire value is multiplied by 1.5, again to round out the estimate
TCP/IP Stack memory allocation space / Network Abstraction Layer (NAL) memory allocation space / MSpace memory allocated to the TCP/IP Stack heap (kilobytes, not including memory allocated by device drivers at startup)	<p>3072 kilobytes</p> <p>NOTE: The TCP/IP Stack must allocate all necessary memory on start up to be deterministic. This allocated memory value should be large enough to include all transmit and receive buffers.</p>
TCP/IP Stack memory allocation space / Network Abstraction Layer (NAL) memory allocation space / Auto expand MSpaces	Disabled

Change Monitoring Settings

Control Panel Setting	Recommended Value for Deployment
Enable instrumentation within the subsystem for tracing real-time applications	Disabled for lowest latencies

Configure watchdog timer settings

Control Panel Setting	Recommended Value for Deployment
Monitor for runaway threads <ul style="list-style-type: none">• Timeout	Disabled for performance purposes

Configure exception support

Control Panel Setting	Recommended Value for Deployment
Choose a method for how to handle exceptions	Structured Exception Handling (default)
Choose a method for treating a faulting process	Terminate Faulting Processes (default)

Control power management settings

Control Panel Setting	Recommended Value for Deployment
Enable Windows idle detection	Not selected NOTE: To eliminate jitter with RTSS timer response latency, we recommend that you disable Windows idle detection. As a result, you may see 100% CPU usage in the Windows Task Manager when the Subsystem is running. There is no side effect on Windows load balancing for this type of 100% CPU usage.
Windows Energy/Performance Bias	Override Windows

NOTE: For optimal performance when running RTX64 on a laptop, we recommend that you convert Display adapters to Microsoft Basic Display Adapter in the Windows Device Manager. If you choose not to convert display adapters, you may experience latency.

1

Scenario 1: End User

In this scenario, a single end user installs RTX64 on their development machine, and activates and configures RTX64 through the Activation and Configuration utility.

Product Installation

Before Installing

Before beginning the installation, do the following:

- Review the *RTX64 Runtime Install Guide*.
- Verify that your configuration meets the requirements described in the *RTX64 Runtime Install Guide*.
- You must have administrator privileges on your system. Log on with administrator privileges or start the RTX64 installation using **Run as Administrator**.
- Exit all Windows programs.

Performing the Install

TO INSTALL THE RTX64 RUNTIME:

1. Download the zip file from the IntervalZero website:

<http://www.intervalzero.com/rtx-downloads/rtx64-downloads/>

2. Extract the contents of the zip file.
3. Double-click the self-extracting executable.
4. Click **Next** in the IntervalZero RTX64 Runtime installation Welcome window.
5. Read the End User License Agreement, select **I accept the terms in the license agreement** and then click **Next**.
6. Optionally, in the Destination Folder screen, choose a destination location other than the default: `C:\Program Files\IntervalZero\RTX64`.
7. Click **Next** in the Destination Folder screen.
8. In the Custom Setup screen, optionally select the components you want to install. Note that the RT-TCP/IP stack requires a separate activation key. Click **Next** when finished.
9. In the Ready to Install the Program screen click **Install**.
10. Click **Finish** in the installation Completed screen.
11. Activate and configure your product.
12. Reboot your computer, and then choose the RTX64 boot configuration at system startup:

[Operating System] - RTX64

Product Activation and Configuration

The Activation and Configuration dialog appears once RTX64 has been successfully installed. You must activate your RTX64 product and configure the boot configuration through this dialog.

Recommended License Type:

Node Locked – Single Activation. For more information, see [License Types](#).

You can activate and lock your RTX64 product components to a specific machine or IntervalZero-provided dongle.

NOTE: Licenses for RTX64 3.x and previous versions will not work with RTX64 4.0. You must purchase a new license to activate RTX64 4.0.



This warning symbol appears in the Activation and Configuration utility whenever an issue is encountered. When the warning symbol appears, hover the mouse over it for more information.

Activating Product Components to a Machine

Follow the appropriate steps below to license RTX64 components to a specific machine.

NOTE: The steps required to activate the components will depend on whether or not the machine is connected to the Internet.

TO ACTIVATE RTX64 PRODUCT COMPONENTS TO A MACHINE:

1. Launch the **RTX64 Activation and Configuration** utility from **Start > All Programs > RTX64 4.0 Runtime > RTX64 Activation and Configuration**. The product components activated by your current key are indicated by a check mark.
2. Choose the appropriate activation option:



Activate over the network

Activate immediately using a valid activation key. This option requires a network connection with access to the IntervalZero License Server.



Activate with a fingerprint file

Create a fingerprint file with a valid activation key which you can then convert to a license file and import using the **Activate with a license file** option.



Activate with a license file

Activate by importing a valid license file.

Activate Over the Network

Use this option to activate immediately using a valid activation key.



NOTE: This option requires a network connection with access to the IntervalZero License Server.

TO ACTIVATE OVER THE NETWORK:

1. Click **Activate over the network**.



2. Make sure your machine is connected to the Internet with access to the IntervalZero License Server.

Icon:		
Status:	Network connection established	Unable to establish a network connection
Next steps:	Continue with activation	Make sure all network cables are plugged in and click the Network icon to refresh. If a network connection cannot be established, you can do one of the following: <ul style="list-style-type: none">• Try to configure a Proxy Server.• Follow the steps under Activate with a fingerprint file.

3. Enter a valid activation key.

NOTE: You can find your activation key in the email you received from IntervalZero Sales upon purchase of RTX64.

4. Click **Activate**. The product components activated by this key are added to the Components box on the right side of the Activation and Configuration dialog.
5. Create a RTSS boot configuration, if one has not already been created. See [Setting the RTSS Boot Configuration](#) for more information.



IMPORTANT! You must set a RTSS boot configuration before you can use RTX64.

Configuring a Proxy Server

Follow the steps below to configure a proxy server. You may need to do this if a network connection cannot be established.

TO CONFIGURE A PROXY SERVER:

1. Click **Configure proxy server**.



2. Provide the requested settings:

- Server
- Port
- User Name
- Password

NOTE: This information can be provided by your IT department.

3. Click **OK**.

Activate with a Fingerprint File

Use this option to create a fingerprint file with a valid activation key which you can then import using the [Activate with a license file](#) option.

TO ACTIVATE WITH A FINGERPRINT FILE:

1. Click **Activate with a fingerprint file**.



2. Enter a valid activation key and then click **Save As**.

NOTE: You can find your activation key in the email you received from IntervalZero Sales upon purchase of RTX64.

3. In the **Save As** dialog, name the file `fingerprint.rfp`. By default, the file will be saved to the desktop.
4. Navigate to the desktop, and then copy and paste the file `fingerprint.rfp` to an external device.
5. Connect the device to a machine with Internet connectivity.
6. Launch a web browser, and navigate to <http://Activation.IntervalZero.com>.
7. Browse for and open the file `fingerprint.rfp`.
8. Click **Activate** to generate a license (`.lic`) file.
9. Click **Save** if your browser prompts you to save the license file. Some browsers automatically save the downloaded license file without prompting.
10. Copy the file `License.lic` to the external device, and transfer it to the machine on which RTX64 is installed.
11. **Activate with a license file** (see below).

NOTE: Once a fingerprint file is saved, this section collapses, and the Activate with a license file section expands automatically.

Activate with a License File

Use this option to activate by importing a valid license file, such as a license file created from a fingerprint file created by the above option.

TO ACTIVATE WITH A LICENSE FILE:

1. Click **Activate with a license file**.



2. Click **Import...** and then browse for and open the file `License.lic`.
3. Create a RTSS boot configuration, if one has not already been created. See [Setting the RTSS Boot Configuration](#) for more information.



IMPORTANT! You must set a RTSS boot configuration before you can use RTX64.

Activating Product Components to a Dongle

This topic walks you through the steps required to activate RTX64 product components to an IntervalZero-provided dongle. This is a small form factor dongle on which the license resides.

NOTE: The steps required to activate the components will depend on whether or not the machine is connected to the Internet.

Activation Options

You have three options when purchasing an IntervalZero-provided dongle and a product license at the same time:

- **Option 1 (default)** – IntervalZero activates the dongle for you when you purchase the software and a small form factor dongle. Simply plug in the dongle to use RTX64.
- **Option 2** – Request that IntervalZero not activate the dongle for you when you purchase the software and a small form factor dongle. You will then need to activate the product to the dongle yourself, following the steps below.
- **Option 3** – Use an existing small form factor dongle. You will need to activate the product the dongle yourself, following the steps below.




NOTE: You can also license RTX64 components to an IntervalZero-provided dongle using the Dongle Activation Utility. The IntervalZero-provided Dongle Activation Utility can be used to activate licensed components on other machines similar to the pre-activation service you can request from IntervalZero. You can download the Dongle Activation Utility from the IntervalZero website at <http://www.intervalzero.com/rtx-downloads/tools-utilities/>.

IMPORTANT! You cannot license RTX64 components to a dongle when more than one dongle is connected to the machine.

Follow the appropriate steps below to license RTX64 components to an IntervalZero-provided dongle. If you have a dongle that has already been activated, jump to step [Using a Pre-Activated Dongle](#).

TO ACTIVATE RTX64 PRODUCT COMPONENTS TO A DONGLE:

1. Launch the **RTX64 Activation and Configuration** utility from **Start > All Programs > RTX64 4.0 Runtime > RTX64 Activation and Configuration**.
2. Check the status of the dongle icon in the **Activation and Configuration** dialog:

Icon:			
Status:	Dongle connected and active	Dongle not connected / not active	Multiple dongles detected
Next steps:	Choose the appropriate activation option to lock the RTX64 component(s) to the dongle.	Make sure it is securely connected to your machine. If the dongle still isn't recognized, the RTX64 component(s) will be locked to the machine. Choose the appropriate activation option only if you want to license to the machine.	You cannot license RTX64 components to a dongle when more than one dongle is connected to the machine. Remove all additional dongles until there is only one connected to the machine.

IMPORTANT! Once components are locked to a dongle, that dongle must be connected in order to use RTX64 components on that machine.

3. Choose the appropriate activation option:



Activate over the network

Activate immediately using a valid activation key. This option requires a network connection with access to the IntervalZero License Server.



Activate with a fingerprint file

Create a fingerprint file with a valid activation key which you can then convert to a license file and import using the **Activate with a license file** option.



Activate with a license file

Activate by importing a valid license file.

Activate Over the Network

Use this option to activate immediately using a valid activation key.

NOTE: This option requires a network connection with access to the IntervalZero License Server.

TO ACTIVATE OVER THE NETWORK:

1. Click **Activate over the network**.



2. Make sure your machine is connected to the Internet with access to the IntervalZero License Server.

Icon:



Status:	Network connection established	Unable to establish a network connection
Next action:	Continue with activation	<p>Make sure all network cables are plugged in and click the Network icon to refresh. If a network connection cannot be established, you can do one of the following:</p> <ul style="list-style-type: none"> • Try to configure a Proxy Server. • Follow the steps under Activate with a fingerprint file.

3. Enter a valid activation key.

NOTE: You can find your activation key in the email you received from IntervalZero Sales upon purchase of RTX64.

4. Click **Activate**. The product components activated by this key are added to the Components box on the right side of the Activation and Configuration dialog.
5. Create a RTSS boot configuration, if one has not already been created. See [Setting the RTSS Boot Configuration](#) for more information.



IMPORTANT! You must set a RTSS boot configuration before you can use RTX64.

IMPORTANT! Once components are locked to a dongle, that dongle must be connected in order to use RTX64 components on that machine.

Configuring a Proxy Server

Follow the steps below to configure a proxy server. You may need to do this if a network connection cannot be established.

TO CONFIGURE A PROXY SERVER:

1. Click **Configure proxy server**.



2. Provide the requested settings:

- Server
- Port
- User Name
- Password

NOTE: This information can be provided by your IT department.

3. Click **OK**.

Activate with a Fingerprint File

Use this option to create a fingerprint file with a valid activation key which you can then import using the [Activate with a license file](#) option.

TO ACTIVATE WITH A FINGERPRINT FILE:

1. Click **Activate with a fingerprint file**.



2. Enter a valid activation key and then click **Save As**.

NOTE: You can find your activation key in the email you received from IntervalZero Sales upon purchase of RTX64.

3. In the **Save As** dialog, name the file `fingerprint.rfp`. By default, the file will be saved to the desktop.

4. Navigate to the desktop, and then copy and paste the file `fingerprint.rfp` to an external device.
5. Connect the device to a machine with Internet connectivity.
6. Launch a web browser, and navigate to <http://Activation.IntervalZero.com>.
7. Browse for and open the file `fingerprint.rfp`.
8. Click **Activate** to generate a license (`.lic`) file.
9. Click **Save** if your browser prompts you to save the license file. Some browsers automatically save the downloaded license file without prompting.
10. Copy the file `License.lic` to the external device, and transfer it to the machine on which RTX64 is installed.
11. **Activate with a license file** (see below).

NOTE: Once a fingerprint file is saved, this section collapses, and the Activate with a license file section expands automatically.

Activate with a License File

Use this option to activate by importing a valid license file, such as a license file created from a fingerprint file created by the above option.

TO ACTIVATE WITH A LICENSE FILE:

1. Click **Activate with a license file**.



2. Click **Import...** and then browse for and open the file `License.lic`.
3. Create a RTSS boot configuration, if one has not already been created. See [Setting the RTSS Boot Configuration](#) for more information.



IMPORTANT! You must set a RTSS boot configuration before you can use RTX64.




IMPORTANT! Once components are locked to a dongle, that dongle must be connected in order to use RTX64 components on that machine.

Using a Pre-Activated Dongle

If the dongle you have received has been pre-activated, follow the steps below:

TO USE A DONGLE THAT HAS ALREADY BEEN ACTIVATED:

1. Plug in the dongle (the license file is already on the dongle).
2. Connect the dongle to a USB port on the machine.
3. Open the **Activation and Configuration** dialog. This dialog appears once RTX64 has been installed. You can also launch it from **Start > All Programs > RTX64 4.0 Runtime > RTX64 Activation and Configuration**.
4. Make sure the Activation and Configuration utility recognizes the dongle:

Icon:			
Status:	Dongle connected and active	Dongle not connected / not active	Multiple dongles detected
Next steps:	Choose the appropriate activation option to lock the RTX64 component(s) to the dongle.	Make sure it is securely connected to your machine. If the dongle still isn't recognized, the RTX64 component(s) will be locked to the machine. Choose the appropriate activation option only if you want to license to the machine.	You cannot license RTX64 components to a dongle when more than one dongle is connected to the machine. Remove all additional dongles until there is only one connected to the machine.

Proceed once you see the Dongle Active icon.

5. Create a RTSS boot configuration, if one has not already been created.



IMPORTANT! You must set a RTSS boot configuration before you can use RTX64.

Setting the RTSS Boot Configuration

You can assign available processors to Windows or RTX64 through the RTX64 Activation and Configuration utility. The RTX64 Activation utility automatically detects the total number of processors on your system.

NOTE: If your system is hyper-threaded, it is recommended that you assign an even number of processors between Windows and RTX64. The Windows logical processor and RTSS logical processor must not share the same physical processor.



NOTE: This warning icon indicates that the RTSS boot configuration needs to be reconfigured.

TO SET THE RTSS BOOT CONFIGURATION THROUGH THE ACTIVATION AND CONFIGURATION DIALOG:

1. Launch the **RTX64 Activation and Configuration** utility from **Start > All Programs > RTX64 4.0 Runtime > RTX64 Activation and Configuration**.
2. In the **Activation and Configuration** dialog, click **Set the RTSS boot configuration**.



3. Assign processors between Windows and RTX64. For example, on a machine with 8 processors, and a Professional Runtime license at minimum, you can assign up to 7 processors for RTX64.

NOTE: We recommend you do not split **Hyper-threaded cores** between Windows and RTX64, as it can cause loss of determinism.

4. Click **Apply** to complete configuration.

NOTE: The Apply button remains grayed-out until a valid configuration is provided.

5. When you are prompted, click **Yes** to reboot your computer.

6. Restart the system. Choose the RTX64 boot configuration at system startup.

NOTE: You must reboot the machine if you change the number of Windows processors. If you change the number of RTSS processors, you must restart the RTX64 Subsystem.

NOTE: Even if you don't reboot immediately, all changes will be saved and will take effect after the next reboot. The RTX64 Subsystem will not work correctly until after the next reboot.

NOTE: On Windows 8.1, configuration changes will only take effect following a restart, not a shutdown.

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Scenario 2: Installing RTX64 Silently

In this scenario, the installation, activation and configuration of RTX64 is done silently through a Command Prompt interface to the RTX64 Runtime product installation. The command line interface can be invoked from the command line or used within your own product installation process so as not to require user interaction during the RTX64 installation process.

The method used to activate and configure will depend on whether or not the user has network connectivity.

Product Installation

Before Installing

Before beginning the installation, do the following:

- Review the *RTX64 Runtime Installation Guide*.
- Verify that your configuration meets the system requirements described in the *RTX64 Runtime Installation Guide*.
- You must have administrator privileges on your system. Log on with administrator privileges or start the RTX64 installation using Administrator privileges.
- You must reboot the system after RTX64 is installed.

Getting the Installation Package

This release can be downloaded from IntervalZero's website or copied from the IntervalZero CD.

NOTE: The RTX64 Runtime components are also available as merge modules that can be included in the installation of an OEM product. See [Scenario 3: OEM Including RTX64 Merge Modules Within Their Installation](#) for more information.

Performing the Install

The installer provides the ability to install the RTX64 Runtime from the command line. This makes it possible to install the RTX64 runtime within another product installation. Take note of the following information before you begin.

- **Administrator privileges are required** — Installation must be done from an account that has administrator privileges.

You can install the RTX64 Runtime silently using a response file. The response file contains information on the data and system customizations selected by the user at run time.

IntervalZero-Provided Response File

IntervalZero provides a default response file for silent installation of the RTX64 Runtime, available from the ResponseFiles folder.

- `RTX64_4.0_Runtime_Install_Response_File.iss` – installs RTX64 4.0 Runtime product to the default location and includes all features.

Creating a Custom Response File

Follow these instructions to create a new response file called `Setup.iss`. This file is similar to an INI file.

TO CREATE A NEW RESPONSE FILE:

Run this command:

```
RTX64_4.0_Runtime_Setup.exe /r
```

This launches the RTX64 Runtime installer, records the selections and customizations you make, and saves the data to a custom `.iss` file called `Setup.iss` in the system's Windows folder.

TO SPECIFY A NEW NAME AND LOCATION:

To specify an alternative response file name and location, use the `/f1` option.

For example, to create a response file named `RTX64Runtime.iss` in the `C:\temp` directory, you would run:

```
RTX64_4.0_Runtime_Setup.exe /r /f1"C:\temp\RTX64Runtime.iss"
```

TO CUSTOMIZE FEATURES:

The sections of a response file must be ordered as follows:

1. Dialog Sequence Section
2. Dialog Data Sections (one per dialog)

Data entries consist of `<name=value>` pairs, as in the following example:

```
Dlg0={35FFCE40-6B78-422A-8012-85C8B466D941}-SdWelcome-0
```

For more information on manually creating a response file, visit

<https://helpnet.flexerasoftware.com/installshield22helpplib/helplibrary/CreatetheResponseFile.htm>

Installing with a Response File

TO SILENTLY INSTALL WITH THE INTERVALZERO-PROVIDED DEFAULT RESPONSE FILE:

```
Run RTX64_4.0_Runtime_Setup.exe /s /f1"<path to the ResponseFiles folder>\RTX64_4.0_Runtime_Install_Response_File.iss"
```

TO SILENTLY INSTALL WITH A CUSTOM RESPONSE FILE:

```
Run RTX64_4.0_Runtime_Setup.exe /s /f1"<path to your custom response file>"
```

For example:

```
RTX64_4.0_Runtime_Setup.exe /s /f1"C:\temp\RTX64Runtime.iss"
```

NOTE: The InstallShield icon appears on the system Task Bar during silent installation.

Log Files

When running an RTX64 installation in silent mode (using the `/s` option), the log file `Setup.log` is created in the same directory as the response file. To specify an alternative log file location and/or file name, use the `/f2` option.

For example:

```
RTX64_4.0_Runtime_Setup.exe /s /f2"C:\Setup.log"
```

Product Activation and Configuration

You can activate your product and configure the RTX64 boot configuration using a Command Line utility

Recommended License Type:

Node Locked – Pool Activation. For more information, see [License Types](#).

Activating your Product

TO ACTIVATE YOUR PRODUCT (INTERNET CONNECTION REQUIRED):

1. Navigate to the `C:\Program Files\IntervalZero\Common\bin` directory and run `Rtx64ActivationUtil.exe` as Administrator.
2. Type the `-a` flag, and then provide your activation key. For example:

```
Rtx64ActivationUtil.exe -a IZRTX64-111-2222-3333-4444-5555-IZTCP64-111-2222-3333-4444-5555
```

NOTE: You can find your activation key in the email you received from IntervalZero Sales.

3. If running from a command prompt, the activated components are displayed:
4. If you want to force activation to an IntervalZero-provided dongle, you can use the `-dongle` flag. For example:

```
RTX64ActivationUtil.exe -a IZRTX64-111-2222-3333-4444-5555-IZTCP64-111-2222-3333-4444-5555 -dongle (forces activation to dongle)
```


Configuring your System

Note that your system must be licensed before you can configure system processors.

SETTING THE BOOT CONFIGURATION:

1. Navigate to the `C:\Program Files\IntervalZero\Common\bin` directory and run `Rtx64ActivationUtil.exe` as Administrator.
2. Provide the number of Windows `-w` and RTSS `-r` processors. For example, to assign 3 processors to Windows and 5 processors to RTX64 on a dedicated system, you would type:

```
Rtx64ActivationUtil.exe -w 3 -r 5
```

3. Restart the system.

3

Scenario 3: Including RTX64 Merge Modules within Your Installation

In this scenario, RTX64 is installed by including RTX64 Merge Modules within your own product installation process. Activation and configuration occurs silently on the target system after installation is completed.

Product Installation

Before Installing

- Before starting installation of RTX64, review the system requirements in the *RTX64 Install Guide for Merge Modules*.

Performing the Install

TO INSTALL RTX64 MERGE MODULES:

1. Download the self-extracting executable from the IntervalZero web site:

<http://www.intervalzero.com/rtx-downloads/rtx64-downloads/>

2. Double-click the installation.
3. Click **Next** in the IntervalZero RTX64 Merge Modules installation Welcome window.
4. Read the End User License Agreement, select **I accept the terms in the license agreement** and then click **Next**.
5. In the Destination Folder screen, select the default folder `C:\Program Files (x86)\IntervalZero\RTX64 Merge Modules\<Version>\`, and then click **Next**.
6. In the Ready to Install the Program screen click **Install**.
7. Click **Finish** in the installation Completed screen.

Merge Module Deployment

Once the merge modules have been installed onto the development system, they can be included in a setup file that will be installed on a target system.

Runtime Installation Requirements

In addition to the target machine operating system requirements listed at the start of this document, take note of the following information when RTX64 merge modules are added to an installation.

- **Administrator privileges are required** — Installations using RTX64 merge modules must be done from an account that has administrator privileges.
- You must reboot after RTX64 has been installed, activated and configured.

Merge Module Dependencies

If any of the RTX64 merge modules are added to an installation, they must include the RTX64 Subsystem, which is contained in the merge module file `Subsystem.msm`.

Target Activation and Configuration

Once RTX64 is installed on your target system, you must activate the RTX64 product and configure system processors using a Command Line utility.

Recommended License Type:

Node Locked – Pool Activation. For more information, see [License Types](#).

Activating your Product

TO ACTIVATE YOUR PRODUCT (INTERNET CONNECTION REQUIRED):

1. Navigate to the `RTX64\bin` directory and run `Rtx64ActivationUtil.exe` as Administrator.
2. Type the `-a` flag, and then provide your activation key. For example:

```
RtxActivation64Util.exe -a IZRTX64-111-2222-3333-4444-5555-IZTCP64-111-2222-3333-4444-5555
```

NOTE: You can find your activation key in the email you received from IntervalZero Sales.

3. If running from a command prompt, the activated components are displayed.
4. If you want to force activation to an IntervalZero-provided dongle, you can use the `-dongle` flag. For example:

```
RTX64ActivationUtil.exe -a IZRTX64-111-2222-3333-4444-5555-IZTCP64-111-2222-3333-4444-5555 -dongle (forces activation to dongle)
```

Configuring your System

You must license your system before you can configure system processors.

NOTE: We recommend you disable Hyper-Threading. If Hyper-Threading remains enabled, it is recommended that you assign an even number of processors between Windows and RTX64. The Windows logical processor and RTSS logical processor must not share the same physical processor.

SETTING THE BOOT CONFIGURATION:

1. Navigate to the `RTX64\bin` directory and run `Rtx64ActivationUtil.exe` as Administrator.
2. Provide the number of Windows `-w` and RTSS `-r` processors. For example, to assign 3 processors to Windows and 5 processors to RTX64 on a dedicated system, you would type:

```
Rtx64ActivationUtil.exe -w 3 -r 5
```

3. Restart the system.

4

Scenario 4: Deploying in an Image for Auto Activation

In this scenario, RTX64 is installed and configured for auto activation before an image is created for deployment.

Deployment Steps

Deployment of RTX64 in this scenario requires the following steps:

1. Product Installation
2. Product Activation and Configuration
3. Image Creation
4. RTX64 Activation on the Target System

Product Installation

Before Installing

Before beginning the installation, do the following:

- Review the *RTX64 Runtime Install Guide*.
- Verify that your configuration meets the requirements described in the *RTX64 Runtime Install Guide*.
- You must have administrator privileges on your system. Log on with administrator privileges or start the RTX64 installation using **Run as Administrator**.
- Exit all Windows programs.

NOTE: When you upgrade your operating system (for example, from Windows 7 to Windows 8.1), you must uninstall and then reinstall RTX64 after the OS upgrade.

Performing the Install

TO INSTALL RTX64:

1. Download the zip file from the IntervalZero web site:

<http://www.intervalzero.com/rtx-downloads/rtx64-downloads/>

2. Extract the contents of the zip file.
3. Double-click the self-extracting executable.
4. Click **Next** in the IntervalZero RTX64 Runtime installation Welcome window.
5. Read the End User License Agreement, select **I accept the terms in the license agreement** and then click **Next**.
6. Optionally, change to a destination other than the default: `C:\Program Files\IntervalZero\RTX64`.
7. Click **Next** in the Destination Folder screen.
8. In the Custom Setup screen, optionally select the components you want to install. Note that the RT-TCP/IP stack requires a separate activation key. Click **Next** when finished.
9. In the Ready to Install the Program screen, click **Install**.
10. Click **Finish** in the installation Completed screen.

11. Activate your product.
12. Reboot your computer, and then choose the RTX64 boot configuration at system startup

Product Activation and Configuration

You can set up your system to auto-activate your product and configure the RTX64 boot configuration using a Command Line utility.

Recommended License Type:

Node Locked – Pool Activation. For more information, see [License Types](#).

Auto-Activating RTX64

TO ACTIVATE YOUR PRODUCT (INTERNET CONNECTION):

1. Navigate to the `RTX64\bin` directory and run `Rtx64ActivationUtil.exe` as Administrator.
2. Type the `-aa` flag, and then provide your activation key. For example:

```
RtxActivationUtil.exe -aa IZRTX64-111-2222-3333-4444-5555-IZTCP64-111-2222-3333-4444-5555
```

NOTE: You can find your activation key in the email you received from IntervalZero Sales.

This will set up the system to activate upon next reboot.

3. If you want to force activation to an IntervalZero-provided dongle, you can use the `-dongle` flag. For example:

```
RTX64ActivationUtil.exe -aa IZRTX64-111-2222-3333-4444-5555-IZTCP64-111-2222-3333-4444-5555 -dongle (forces activation to dongle)
```

TO ACTIVATE YOUR PRODUCT (NO INTERNET CONNECTION):

1. Navigate to the `RTX64\bin` directory and run `Rtx64ActivationUtil.exe` as Administrator.

2. Type the `-af` flag, and then provide your activation key. For example:

```
Rtx64ActivationUtil.exe -af IZRTX64-111-2222-3333-4444-5555-  
IZTCP64-111-2222-3333-4444-5555 fingerprint.rfp
```

NOTE: You can find your activation key in the email you received from IntervalZero Sales.

This will set up the system to generate a fingerprint file on the desktop. The fingerprint can then be used to generate a license file.

3. If you want to force activation to an IntervalZero-provided dongle, you can use the `-dongle` flag. For example:

```
RTX64ActivationUtil.exe -af -dongle IZRTX64-111-2222-3333-4444-  
5555-IZTCP64-111-2222-3333-4444-5555 (forces activation to dongle)
```

Configuring your System

You must license your system before you can configure system processors.

NOTE: If your system is hyper-threaded, it is recommended that you assign an even number of processors between Windows and RTX64. The Windows logical processor and RTSS logical processor must not share the same physical processor.

SETTING THE BOOT CONFIGURATION:

1. Navigate to the `RTX64\bin` directory and run `Rtx64ActivationUtil.exe` as Administrator.
2. Provide the number of Windows `-w` and RTSS `-r` processors. For example, to assign 3 processors to Windows and 5 processors to RTX64 on a dedicated system, you would type:

```
Rtx64ActivationGUI.exe -w 3 -r 5
```

3. Restart the system.

Image Creation

Once RTX64 has been installed and successfully activated and configured, create an image for deployment on the target system.

You can use the RTX64Config command line utility and the RTX64 Framework to configure the RTSS Subsystem prior to image creation. For instance, you can set the HAL Timer Period and Local Memory allocation behavior - two options you will not likely change on the target system(s).

RTX64 Activation on the Target System

Once the image is deployed on the target system, reboot the machine. RTX64 will be automatically activated if one of the following scenarios is true:

- The machine is connected to the network
- or
- You have already generated a unique license file for all systems, which can be imported during auto activation

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Scenario 5: Windows 10 IoT Enterprise

In this scenario, a single end user installs RTX64 on their development machine running Windows 10 IoT Enterprise, and activates and configures RTX64 through the Activation and Configuration utility.

NOTE: RTX64 supports only activated and deferred activated Windows systems.

Product Installation and Activation

The instructions for installing, activating, and configuring RTX64 on Windows 10 IoT Enterprise system are the same as those outlined in [Scenario 1: End User](#).

Windows 10 IoT Core

Interested in using RTX64 with Windows 10 IoT Core? Contact Product Management (productmanagement@intervalzero.com) or Sales (sales@intervalzero.com or 781-996-4481) for information.

Resources

You can find more information on RTX64 deployment scenarios in these resources:

Installation, Activation, and Configuration

- *RTX64 Runtime Install Guide*
- *RTX64 Merge Modules Install Guide*

General Product Information

- RTX64 Product Documentation > <http://www.intervalzero.com/technical-support/guides-and-minitutorials/>
- RTX64 Online Help > http://www.intervalzero.com/library/RTX64/HTML5/RTX64_Help.htm

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

Before calling technical support, determine the version of RTX64 installed on your system. Also, 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.