RTI Ada Language Support

Platform Notes

Version 7.3.0

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1 Platform Notes

This document provides platform-specific instructions on how to compile, link, and run applications built with *RTI® Ada Language Support* .

Ada Language Support is built on top of the *RTI Connext®* C API. This document supplements the *RTI Connext Core Libraries Platform Notes*.

2 Installation

As with any target bundle, *Ada Language Support* must be installed after you've installed a host bundle of *Connext*.

Use the **<NDDSHOME>/bin/rtipkginstall** utility (where NDDSHOME is where you installed the host bundle, such as **/home/user/rti_connext_dds-<version>** for non-root users, or **/opt/rti_ connext_dds-<version>** for root users). The package installer is also available in *RTI Launcher*. See the instructions in "Installing Connext," in *Before You Get Started*, in the [RTI Connext Getting Started Guide](#) for installing a target bundle.

> **Note:** Before you can compile Ada applications, you will need to install a target bundle for the supported architecture (x64Linux3gcc4.8.2). This is a separate package file, not part of *Ada Language Support*.

After installing the Ada support package, you can use *rtiddsgen* to generate Ada projects for your IDL types as follows:

```
rtiddsgen -language Ada -example x64Linux3gcc4.8.2 HelloWorld.idl
```

> **Note:** An Ada source package is also available: **rti_ada_language_support-7.3.0-src.tar.gz**.

See the generated README for instructions.

3 Supported Platforms

See the Ada Binding column in the "Add-ons" table of Supported Platforms, in the RTI Connext Core Libraries Release Notes. *Ada Language Support* provides the libraries required to build *Connext* Ada applications for those platforms when using AdaCore GNAT Pro 18.2 (http://www.adacore.com).

See for important information regarding the required Adacore GNAT compiler.

Since the Ada API libraries use the *Connext* C API libraries, you should also refer to the basic Linux platform information applicable to the C programming language and system requirements for Red Hat Enterprise Linux 7 described in the *RTI Connext Core Libraries Platform Notes*.

This document assumes that the platform has been set up to run *Connext* for the C programming language and includes only additional information required for using the Ada programming language.

4 Required Compilers

The required Ada compilers are GNAT Pro 18.2 and GPRbuild Pro 18.2. The code generated by *RTI Code Generator* (*rtiddsgen*) for custom types consists of both Ada and C code.

The Ada source package (**rti_ada_language_support-7.3.0-src.tar.gz**) can be compiled with GNAT Pro version 18.2 - 23.2.

> **Note:** Support for GNAT Pro 18.2 is deprecated, meaning GNAT Pro 18.2 is still supported in this release but will be removed in a future release.

4.1 Ada Language Version

Ada Language Support has been written using the Ada 2012 version of the language. This is the default mode for GNAT Pro 18.2. Since Ada 2012 is almost completely upwards compatible with Ada 2005, programs based on Ada 2005 should compile without issues. Note: You may still build your application source in Ada 2005 compatibility mode (using -gnat05 or -gnat2005).

5 Required System Libraries and Connext Core Libraries

Once GNAT is installed on the development machine, you can use the **gprbuild** compiler to build your Ada applications with *Ada Language Support*. The **gprbuild** compiler uses project files to get information about source code directories and files, source code languages, compiler and linker flags, and other dependent libraries and Ada projects. Sample project files are included in *Ada Language Support* to help you build your Ada library or application with various library configurations.

To include *Ada Language Support* in your Ada application, the following *Connext* API Ada project files (in **$NDDSHOME/lib/gnat/**) must be included in your Ada application project file: **dds.gpr** and **dds-ada.gpr**.[1] To do so, use the Ada "**with**" clause as follows:

```
with "dds.gpr";
with "dds-ada.gpr";
```

These API Ada project files use the NDDSHOME environment variable and three additional external project variables: **OS**, **RTIDDS_LIBRARY_TYPE**, and **RTIDDS_BUILD**. These variables can either be set up in your environment, or by using the **-X** option when calling **gprbuild**.

Possible values for these variables are:

- **OS**: Can be **Linux**, **Windows_NT**, or **unix**. (Default: **unix**)
- **RTIDDS_LIBRARY_TYPE**: Either **static** (statically links the *Connext* Core Libraries into the applications's executable or library) or **relocatable** (dynamically links the *Connext* Core Libraries with the application or library). (Default: **static**)

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[1]Two other project files are provided (dds-libnddsada.gpr and dds-libnddsc.gpr); they are no longer needed but are provided for backward compatibility.

- **RTIDDS_BUILD**: Either **release** or **debug**. (The **debug** option will include debugging information). (Default: **release**)

Note: All possible values for these variables can be found in the API Ada project file, **$NDDSHOME/lib/gnat/dds.gpr**.

The **gprbuild** compiler uses an environment variable called **ADA_PROJECT_PATH**, to specify Ada project file paths. **$NDDSHOME/lib/gnat/** must be added to the **ADA_PROJECT_PATH** environment variable. These project files use another Ada project file, **dds-core.gpr**, found in the same path, as well as the specification (header) files of the API for Ada found in **$NDDSHOME/include/ndds/dds_ada**/. You do not need to add these files/paths to an environment variable since their locations and names are already specified in the provided API Ada project files.

The libraries required by GNAT to compile an Ada application (used on a development machine) and run an Ada application (used on both development and deployment machines) can be found in the GNAT documentation. Follow those instructions to set up a development and a deployment machine.

The *Ada Language Support* libraries are located in **$NDDSHOME/lib/<architecture>**. Their ALI files are in **$NDDSHOME/lib/<architecture>/ali.** (Where *<architecture>* is a supported architecture from 3 Supported Platforms on page 3, such as x64Linux3gcc4.8.2).

Table 5.1 Libraries

Build Type	Library Filenames
Static Release	librtiddsadaz.a libnddscz.a libnddscorez.a
Static Debug	librtiddsadazd.a libnddsczd.a libnddscorezd.a
Dynamic Release	librtiddsada.so libnddsc.so libnddscore.so
Dynamic Debug	librtiddsadad.so libnddscd.so libnddscored.so

If you are using the dynamic version of the library, you must add its paths to the **LD_LIBRARY_PATH** environment variable on the deployment machine.

6 Required Compiler and Linker Flags

The flags required by the Ada compiler and linker, and its C compiler, are defined in the provided *Connext* API for Ada project file and the provided Ada specification file **$NDDSHOME/include/ndds/dds_ada/dds-linker_options__Linux.ads**.

The compiler and linker flags are already configured in the provided Ada project files (64-bit is assumed in the compiler flag). The **gprbuild** compiler will use the configuration corresponding to the desired build type, indicated by Ada project variables provided either as command-line parameters or environment variables to **gprbuild**. These external variables (**OS**, **RTIDDS_LIBRARY_TYPE**, and **RTIDDS_BUILD**) are described in 5 Required System Libraries and Connext Core Libraries on page 5. These variables can be specified using the **-X** switch when calling **gprbuild** to build an Ada application that uses the provided *Connext* API project files for Ada.

For example, if a Linux Ada application is intended to use the dynamic debug version of the *Connext* API for Ada library on a 64-bit single processor architecture, the Ada application project file must include the *Connext* API for Ada library project files as described in 5 Required System Libraries and Connext Core Libraries on page 5 and call **gprbuild** in the following way:

```
gprbuild -p -P application.gpr -XOS=Linux -XRTIDDS_BUILD=debug
-XRTIDDS_LIBRARY_TYPE=relocatable
```

This will instruct **gprbuild** to use the dynamic debug version of the library for *Ada Language Support*, including the necessary compiler and linker flags, on a Linux platform running on a single 64-bit processor architecture.

7 Required Environment Variables for Building Applications

The *Connext* API for Ada project files need the **NDDSHOME** environment variable to locate library, specification, and header files when building an Ada application. This variable is not needed to run such applications.

8 How the Ada Language Support Libraries were Built

Table 8.1 Library-Creation Details provides details on how the libraries for *Ada Language Support* were built. This table is provided strictly for informational purposes; you do not need to use these parameters to compile your application. You may find this information useful if you are involved in any in-depth debugging.

Table 8.1 Library-Creation Details

RTI Architecture	Library Format	Language	Compiler Flags Used by RTI
x64Linux3gcc4.8.2	Static Release	Ada	-gnatf -gnatQ -gnatq -gnat12 -gnatyM2048 -g -fno-strict-aliasing -fPIC -gnatwa -gnato -fcallgraph-info=su -fstack-usage -fstack-check -gnaty3aAbcefhiklnprstx -O2 -ffunction-sections -fdata-sections
		C	-DRTI_UNIX -DRTI_64BIT
	Static Debug	Ada	-gnatf -gnatQ -gnatq -gnat12 -gnatyM2048 -g -fno-strict-aliasing -fPIC -gnatwa -gnato -fcallgraph-info=su -fstack-usage -fstack-check -gnaty3aAbcefhiklnprstx -O0 -ffunction-sections -fdata-sections
		C	-DRTI_UNIX -DRTI_64BIT -g
	Dynamic Release	Ada	-gnatf -gnatQ -gnatq -gnat12 -gnatyM2048 -g -fno-strict-aliasing -fPIC -gnatwa -gnato -fcallgraph-info=su -fstack-usage -fstack-check -gnaty3aAbcefhiklnprstx -O2
		C	-DRTI_UNIX -DRTI_64BIT
	Dynamic Debug	Ada	-gnatf -gnatQ -gnatq -gnat12 -gnatyM2048 -g -fno-strict-aliasing -fPIC -gnatwa -gnato -fcallgraph-info=su -fstack-usage -fstack-check -gnaty3aAbcefhiklnprstx -O0
		C	-DRTI_UNIX -DRTI_64BIT -g