RTI Ada Language Support

Release Notes

Version 6.0.0
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The security features of this product include software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/).

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1 Release Notes

This document provides information on *RTI® Ada Language Support* and supplements the *RTI Connext® DDS Release Notes*. All requirements, compatibility, and known issues described in the *RTI Connext DDS Core Libraries Release Notes* are also applicable to *RTI Ada Language Support*. 
2 System Requirements

2.1 Supported Operating Systems

Ada Language Support provides the libraries required to build Connext DDS Ada applications for the following platforms when using AdaCore GNAT Pro 18.2 (http://www.adacore.com):

Table 2.1 Supported Platforms

<table>
<thead>
<tr>
<th>Operating System</th>
<th>CPU</th>
<th>Compiler</th>
<th>RTI Architecture Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentOS™ 7.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Hat® Enterprise Linux® 7.0, 7.3, 7.5</td>
<td>x64</td>
<td>gcc 4.8.2</td>
<td>x64Linux3gcc4.8.2</td>
</tr>
<tr>
<td>Ubuntu® 14.04 LTS</td>
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<td></td>
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</table>

2.2 Disk and Memory Usage

Disk usage for the combined host and target installation is approximately 350 MB.

2.3 Networking Support

Networking support is the same as described in the RTI Connext DDS Core Libraries Release Notes.
Chapter 3 Compatibility

Below is basic compatibility information for this release.

For backward compatibility information between 6.0.0 and previous releases, see the Migration Guide on the RTI Community Portal (https://community.rti.com/documentation).

3.1 Wire-Protocol Compatibility

*Ada Language Support* communicates over the wire using Real-Time Publish-Subscribe (RTPS) protocol. RTPS 1.0 was introduced in 2001. The current version is 2.3. RTI plans to maintain interoperability between middleware versions based on RTPS 2.x.

*Ada Language Support* is compatible with Connext DDS 5.x and higher, and 4.5f, as well as RTI Data Distribution Service 4.2 - 4.5, except as noted in the RTI Connext DDS Core Libraries Release Notes for 5.3.1 or the Migration Guide for 6.0.0.

3.2 Code Compatibility (Differences with Other Connext DDS APIs)

Like the Connext DDS Core Libraries, *Ada Language Support* uses an API that is an extension of the DCPS layer of the OMG Data Distribution Service (DDS) standard API, version 1.4.

*Ada Language Support* supports the DDS Standard APIs as well as some RTI extension APIs.

API Differences:

The following features are supported in other languages, but are *not* supported in *Ada Language Support*:

- Dynamic Data
- TypeCode, TypeCodeFactory
- Custom flow controllers
3.2 Code Compatibility (Differences with Other Connext DDS APIs)

- Custom content filters
- Transport Registration and configuration through the NDDS_Transport_Support API
- Request-Reply API

The above unsupported features are not part of the OMG DDS specification; they are RTI extensions.
4 What’s New in 6.0.0

- This release is compatible with Connext DDS 6.0.0.
- This release uses GNAT Pro Ada 18.2 and GPRbuild 18.2.

4.1 New platforms

Table 4.1 Platforms Added in 6.0.0

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4.2 Removed platforms

Table 4.2 Platforms Removed in 6.0.0

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</table>

4.3 Manual user type registration no longer needed in Ada

In previous versions of Connext DDS, user types had to be registered manually in DomainParticipants before creating a Topic that used them. This was achieved by using the Register_Type procedure in the type's generated TypeSupport package, which expects the DomainParticipant as its first argument.
Starting with this release, manual registration is no longer needed. The generated TypeSupport package body contains code that will add the user type to a list of types to be registered automatically when creating new DomainParticipants. This means every DomainParticipant created in the application will have out-of-the-box support for all user types whose TypeSupport package is included in the application by means of a "with" clause.

Note: Failing to include the TypeSupport package for a user type is unlikely because Create_Topic needs the type name, and the type name is obtained using Get_Type_Name from the TypeSupport package.

4.4 Support for Zero Copy transfer over shared memory in Ada

Zero Copy transfer over shared memory allows reducing the number of copies to zero for communications within the same host. This feature accomplishes zero copies by using the shared memory builtin transport to send references to samples within a shared memory segment owned by the DataWriter, instead of using the shared memory builtin transport to send the serialized sample content by making a copy.

With Zero Copy transfer over shared memory, there is no need for the DataWriter to serialize a sample, and there is no need for the DataReader to deserialize an incoming sample, since the sample is accessed directly on the shared memory segment created by the DataWriter. The new TransferModeQosPolicy specifies the properties of a Zero Copy DataWriter.

For more information, see the chapter "Sending Large Data" in the RTI Connext DDS Core Libraries User's Manual.
5 What’s Fixed in 6.0.0

5.1 Function DDS.To_DDS_Wide_String in Ada failed, raising exception

When using DDS.To_DDS_Wide_String in Ada to convert a Standard.Wide_String into a DDS.Wide_String, a STORAGE_ERROR was raised and the operation failed. This problem has been resolved.

This fix creates backwards-incompatible changes. For more information, see the Migration Guide on the RTI Community Portal (https://community.rti.com/documentation).

[RTI Issue ID CORE-7388]

5.2 Wrong conversion in Ada functions To_Duration and To_Duration_T

The functions To_Duration and To_Duration_T interpreted the "nanosec" field in a DDS.Duration_T structure as microseconds instead of nanoseconds. This problem has been resolved.

[RTI Issue ID CORE-8530]

5.3 Converting DDS.Wide_String to Standard.Wide_String failed

When using Ada's DDS.To_Standard_Wide_String function to convert a DDS.Wide_String to a Standard.Wide_String, the function raised a CONSTRAINT_ERROR and failed to convert the string. If used in a DataReader listener, the internal reception thread stopped working without producing error messages and no new samples could be received. This problem has been resolved.

This fix creates backwards-incompatible changes. For more information, see the Migration Guide on the RTI Community Portal (https://community.rti.com/documentation).

[RTI Issue ID CORE-8975]
5.4 DDS.WriteParams_T argument in Write_W_Params API could not be updated

The third parameter of the **write_W_Params DataWriter** method has changed from "in" to "in out", meaning the argument can now be modified. Previously, it could not be modified (the operation **Write_W_Params** failed).

This fix creates a backwards-incompatible API change. For more information, see the *Migration Guide* on the RTI Community Portal ([https://community.ri.com/documentation](https://community.ri.com/documentation)).

[RTI Issue ID CORE-9171]
6 Limitations

- Bit fields in the IDL are not supported for Ada.
- The Hello_dynamic example that is available in other languages is not available in Ada.
- When using the -example flag in rtiddgen to generate example code for Ada, the generated project file for compiling and the publisher and subscriber source files are placed under the samples directory, instead of at the top-level directory. Use the Ada project file under the samples directory to compile the example (or use the generated makefile that is located at the top level to compile).
- The code generated by rtiddgen for Ada language is not in pure Ada—it will contain both C and Ada code (Ada code is a wrapper around the C code); therefore a compatible C compiler is needed to compile the generated code.
- Generated code for nested modules in Ada may not compile. Code Generator follows the Object Management Group (OMG) IDL-to-Ada specification in order to map modules:
  - Top level modules (i.e., those not enclosed by other modules) shall be mapped to child packages of the subsystem package, if a subsystem is specified, or root library packages otherwise. Modules nested within other modules or within subsystems shall be mapped to child packages of the corresponding package for the enclosing module or subsystem. The name of the generated package shall be mapped from the module name.
  - The generated code produced by following this specification does not compile when referencing elements from a nested module within the top-level module, as shown in the following example:

```ada
module Outer
  module Inner
    struct Structure
    
    long id;
```
This failure to compile happens because Ada does not allow a parent package to reference definitions in child packages. [RTI Issue ID CODEGENII-813]
7 Known Issues

7.1 Reopening IDL Modules not Supported by rtiddsgen for Ada

Reopening a module in IDL is not supported when using rtiddsgen for Ada. For example, the following IDL file is not supported in Ada:

```idl
module ModuleA {
    struct Struct1 {
        long longValue;
    };
}......
module ModuleA {
    struct Struct2 {
        short shortValue;
    };
}
```

[RTI Issue ID CODEGENII-231]

7.2 API Reference HTML Documentation for Ada May be Inaccurate Regarding Internal APIs

Due to the way the online documentation is generated in this release, some of the internal APIs that are not intended to be called by users (typically with filenames ending with Low_Level.ads or impl.ads, and those APIs that are lacking detailed descriptions) may also appear in the Ada online documentation and should be ignored. When in doubt, refer to the corresponding documentation for another language to determine which APIs are meant to be public.

The parameter names mentioned in the descriptions of some of the APIs may not exactly match the actual parameter names that appear in the Ada .ads file. However, there is usually an obvious one-to-one correspondence between the parameters as described in the descriptions compared to the APIs listed in the Ada .ads file.

[RTI Issue ID CORE-6290]
7.3 API Reference HTML Documentation for Ada May Use Incorrect Entity Names

Links in the Ada online documentation may display wrong entity names. For example, for DDS.Do-
mainParticipant, the displayed name may be DomainParticipant.DDS. This only affects the links. This
issue is caused by AdaCore's tool for documentation generation. RTI is investigating it with AdaCore.

[RTI Issue ID CORE-6270]