Artix™

Artix Configuration Guide

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Making Software Work Together™

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Contents

Part II Configuration Reference

Preface

What is Covered in this Book

The *Artix Configuration Guide* describes how to set up an Artix system environment and explains the Artix configuration concepts. It shows how to use features such as logging and internationalization.

This book also provides a comprehensive reference for the configuration variables in an Artix configuration domain.

Who Should Read this Book

This book is intended for use by system administrators, in conjunction with *Managing and Deploying Artix Solutions*. It assumes that the reader is familiar with Artix administration. Anyone involved in designing a large scale Artix solution will also find this book useful.

Knowledge of middleware or messaging transports is not required to understand the general topics discussed in this book. However, if you are using this book as a guide to deploying runtime systems, you should have a working knowledge of the middleware transports that you intend to use in your Artix solutions.

How to Use this Book

This book is organized as follows:

Part I, Configuring Artix

- Chapter 1 explains how to set up your Artix system environment using the `artix_env` script, and explains the Artix environment variables.
- Chapter 2 provides an overview of the Artix configuration mechanism. It explains Artix configuration files, the syntax for configuration file entries, and command-line configuration.

- Chapter 3 explains how to use the logging features of Artix.
- Chapter 4 explains how Artix handles codeset conversions. It explains which payload formats support international codesets, how each transport handles them.

Part II, Configuration Reference

Part II provides a comprehensive reference for the configuration variables in an Artix configuration domain. It also provides reference information on the Artix logging macros and API.

- Chapter 5 describes the Artix runtime configuration variables.
- Chapter 6 describes the Artix plug-in namespaces and variables.
- Chapter 7 describes the configuration namespaces and variables used to configure Artix security features.
- Chapter 8 describes the CORBA plug-in configuration namespaces and variables.

Finding Your Way Around the Library

The Artix library contains several books that provide assistance for any of the tasks you are trying to perform. The Artix library is listed here, with a short description of each book.

If you are new to Artix

You may be interested in reading:

- Release Notes contains release-specific information about Artix.
- Installation Guide describes the prerequisites for installing Artix and the procedures for installing Artix on supported systems.
- Getting Started with Artix describes basic Artix and WSDL concepts.

To design and develop Artix solutions

Read one or more of the following:

- Designing Artix Solutions provides detailed information about describing services in Artix contracts and using Artix services to solve problems.
- Developing Artix Applications in C++ discusses the technical aspects of programming applications using the C++ API.
- Developing Artix Plug-ins with C++ discusses the technical aspects of implementing plug-ins to the Artix bus using the C++ API.

- Developing Artix Applications in Java discusses the technical aspects of programming applications using the Java API.
- Artix for CORBA provides detailed information on using Artix in a CORBA environment.
- Artix for J2EE provides detailed information on using Artix to integrate with J2EE applications.
- Artix Technical Use Cases provides a number of step-by-step examples of building common Artix solutions.

To configure and manage your Artix solution

Read one or more of the following:

- Deploying and Managing Artix Solutions describes how to deploy Artix-enabled systems, and provides detailed examples for a number of typical use cases.
- Artix Configuration Guide explains how to configure your Artix environment. It also provides reference information on Artix configuration variables.
- IONA Tivoli Integration Guide explains how to integrate Artix with IBM Tivoli.
- IONA BMC Patrol Integration Guide explains how to integrate Artix with BMC Patrol.
- Artix Security Guide provides detailed information about using the security features of Artix.

Reference material

In addition to the technical guides, the Artix library includes the following reference manuals:

- Artix Command Line Reference
- Artix C++ API Reference
- Artix Java API Reference

Have you got the latest version?

The latest updates to the Artix documentation can be found at http://www.iona.com/support/docs.

Compare the version dates on the web page for your product version with the date printed on the copyright page of the PDF edition of the book you are reading.

Searching the Artix Library

You can search the online documentation by using the **Search** box at the top right of the documentation home page:

http://www.iona.com/support/docs

To search a particular library version, browse to the required index page, and use the **Search** box at the top right. For example:

http://www.iona.com/support/docs/artix/3.0/index.xml

You can also search within a particular book. To search within an HTML version of a book, use the **Search** box at the top left of the page. To search within a PDF version of a book, in Adobe Acrobat, select **Edit**|**Find**, and enter your search text.

Online Help

Artix Designer includes comprehensive online help, providing:

- Detailed step-by-step instructions on how to perform important tasks.
- A description of each screen.
- A comprehensive index, and glossary.
- A full search feature.
- Context-sensitive help.

There are two ways that you can access the online help:

- Click the **Help** button on the **Artix Designer** panel, or
- Select **Contents** from the **Help** menu

Additional Resources

The IONA Knowledge Base contains helpful articles written by IONA experts about Artix and other products.

The IONA Update Center contains the latest releases and patches for IONA products.

If you need help with this or any other IONA product, go to IONA Online Support.

Comments, corrections, and suggestions on IONA documentation can be sent to docs-support@iona.com .

Document Conventions

Typographical conventions

This book uses the following typographical conventions:

`Fixed width`	Fixed width (courier font) in normal text represents portions of code and literal names of items such as classes, functions, variables, and data structures. For example, text might refer to the `IT_Bus::AnyType` class. Constant width paragraphs represent code examples or information a system displays on the screen. For example: `#include <stdio.h>`
`Fixed width italic`	Fixed width italic words or characters in code and commands represent variable values you must supply, such as arguments to commands or path names for your particular system. For example: `% cd /users/`*`YourUserName`*
Italic	Italic words in normal text represent *emphasis* and introduce *new terms*.
Bold	Bold words in normal text represent graphical user interface components such as menu commands and dialog boxes. For example: the **User Preferences** dialog.

Keying Conventions

This book uses the following keying conventions:

No prompt	When a command's format is the same for multiple platforms, the command prompt is not shown.
%	A percent sign represents the UNIX command shell prompt for a command that does not require root privileges.
#	A number sign represents the UNIX command shell prompt for a command that requires root privileges.
>	The notation > represents the MS-DOS or Windows command prompt.
. . . . . .	Horizontal or vertical ellipses in format and syntax descriptions indicate that material has been eliminated to simplify a discussion.
[]	Brackets enclose optional items in format and syntax descriptions.
{}	Braces enclose a list from which you must choose an item in format and syntax descriptions.
|	In format and syntax descriptions, a vertical bar separates items in a list of choices enclosed in {} (braces). In graphical user interface descriptions, a vertical bar separates menu commands (for example, select **File**|**Open**).

Part I

Configuring Artix

In this part

This part contains the following chapters:

CHAPTER 1

Getting Started

This chapter explains how to set up your Artix system environment.

In this chapter

This chapter discusses the following topics:

Setting your Artix Environment

Overview

To use the Artix design tools and runtime environment, the host computer must have several IONA-specific environment variables set. These variables can be configured during installation, or later using the `artix_env` script, or configured manually.

Running the artix_env script

The Artix installation process creates a script named `artix_env`, which captures the information required to set your host's environment variables. Running this script configures your system to use Artix. The script is located in the Artix `bin` directory:

```
IT_PRODUCT_DIR\artix\Version\bin\artix_env
```

Command-line arguments

The `artix_env` script takes the following optional command-line arguments:

Table 1: *Options to artix_env Script*

Option	Description
`-compiler vc71`	On Windows, enables support for Microsoft Visual C++ version 7.1 (Visual Studio .NET 2003). By default, Artix is enabled with support for Microsoft Visual C++ version 6.0.

Table 1: *Options to artix_env Script*

Option	Description
`-preserve`	Preserves the settings of any environment variables that have already been set. When this argument is specified, `artix_env` does not overwrite the values of variables that are already set. This option applies to the following environment variables: • `IT_PRODUCT_DIR` • `IT_LICENSE_FILE` • `IT_CONFIG_DIR` • `IT_CONFIG_DOMAINS_DIR` • `IT_DOMAIN_NAME` • `IT_ART_ADMIN_PATH` • `IT_IDL_CONFIG_FILE` • `CLASSPATH` • `PATH` • `LIBPATH (AIX)` • `LD_LIBRARY_PATH` (Solaris, Linux) • `LD_PRELOAD` (Linux) • `SHLIB_PATH` (HP-UX) For more detailed information, see "Artix Environment Variables" on page 4. **Note:** Before using the `-preserve` option, always ensure that the existing environment variable values are set correctly.
`-verbose`	`artix_env` outputs an audit trail of all its actions to `stdout`.

Artix Environment Variables

Overview

This section describes the following environment variables in more detail:

- JAVA_HOME
- IT_PRODUCT_DIR
- IT_LICENSE_FILE
- IT_CONFIG_DIR
- IT_CONFIG_DOMAINS_DIR
- IT_DOMAIN_NAME
- IT_IDL_CONFIG_FILE
- IT_ART_ADMIN_PATH
- PATH

Note: You do not have to manually set your environment variables. You can configure them during installation, or set them later by running the provided `artix_env` script.

The environment variables are explained in Table 2:

Table 2: *Artix Environment Variables*

Variable	Description
JAVA_HOME	The directory path to your system's JDK is specified with the system environment variable JAVA_HOME. This must be set to use the Artix Designer GUI. This defaults to the JVM installed with Artix (IT_PRODUCT_DIR\jre). The Artix installer also enables you to specify a previously installed JVM.

Table 2: *Artix Environment Variables*

Variable	Description
IT_PRODUCT_DIR	IT_PRODUCT_DIR points to the top level of your IONA product installation. For example, on Windows, if you install Artix into the C:\Program Files\IONA directory, IT_PRODUCT_DIR should be set to that directory. **Note:** If you have other IONA products installed and you choose not to install them into the same directory tree, you must reset IT_PRODUCT_DIR each time you switch IONA products. You can override this variable using the -ORBproduct_dir command-line parameter when running your Artix applications.
IT_LICENSE_FILE	IT_LICENSE_FILE specifies the location of your Artix license file. The default value is IT_PRODUCT_DIR\etc\licenses.txt.
IT_CONFIG_DIR	IT_CONFIG_DIR specifies the root configuration directory. The default root configuration directory on UNIX is /etc/opt/iona, and IT_PRODUCT_DIR\artix*Version*\etc on Windows. You can override this variable using the -ORBconfig_dir command-line parameter.
IT_CONFIG_DOMAINS_DIR	IT_CONFIG_DOMAINS_DIR specifies the directory where Artix searches for its configuration files. The configuration domain's directory defaults to IT_CONFIG_DIR\domains. You can override it using the -ORBconfig_domains_dir command-line parameter.

Table 2: *Artix Environment Variables*

Variable	Description
`IT_DOMAIN_NAME`	`IT_DOMAIN_NAME` specifies the name of the configuration domain used by Artix to locate its configuration. This variable also specifies the name of the file in which the configuration is stored. For example, the `artix` domain is stored in `IT_CONFIG_DIR\domains\artix.cfg`. You can override this variable with the `-ORBdomain_name` command-line parameter.
`IT_IDL_CONFIG_FILE`	`IT_IDL_CONFIG_FILE` specifies the configuration used by the Artix IDL compiler. If this variable is not set, you will be unable to run the IDL to WSDL tools provided with Artix. This variable is required for an Artix Devopment installation.The default location is: `IT_PRODUCT_DIR\artix\`*`Version`*`\etc\idl.cfg` **Note:** Do not modify the default IDL configuration file.
`IT_ART_ADMIN_PATH`	`IT_ART_ADMIN_PATH` specifies the location of an internal configuration script used by administration tools. Defaults to `IT_CONFIG_DIR\admin`.

Table 2: *Artix Environment Variables*

Variable	Description

PATH	The Artix `bin` directories are prepended on the `PATH` to ensure that the proper libraries, configuration files, and utility programs (for example, the IDL compiler) are used. These settings avoid problems that might otherwise occur if Orbix and/or Tuxedo (both include IDL compilers and CORBA class libraries) are installed on the same host computer.
	The default Artix `bin` directory is:
	UNIX
	`$IT_PRODUCT_DIR/artix/`*`Version`*`/bin`
	Windows
	`%IT_PRODUCT_DIR%\artix\`*`Version`*`\bin`
	`%IT_PRODUCT_DIR%\bin`

Customizing your Environment Script

Overview

The `artix_env` script sets the Artix environment variables using values obtained from the Artix installer and from the script's command-line options. The script checks each one of these settings in sequence, and updates them, where appropriate.

The `artix_env` script is designed to suit most needs. However, if you want to customize it for your own purposes, please note the following points in this section.

Before you begin

You can only run the `artix_env` script once in any console session. If you run this script a second time, it exits without completing. This prevents your environment from becoming bloated with duplicate information (for example, on your `PATH` and `CLASSPATH`).

In addition, if you introduce any errors when customizing the `artix_env` script, it also exits without completing. This feature is controlled by the `IT_ARTIXENV` variable, which is local to the `artix_env` script. `IT_ARTIXENV` is set to `true` the first time you run the script in a console; this causes the script to exit when run again.

Environment variables

The following applies to the environment variables set by the `artix_env` script:

- The `JAVA_HOME` environment variable defaults to the value obtained from the Artix installer. If you do not manually set this variable before running `artix_env`, it takes its value from the installer. The default location for the JRE supplied with Artix is `IT_PRODUCT_DIR\jre`.
- The following environment variables are all set with default values relative to `IT_PRODUCT_DIR`:
  - `JAVA_HOME`
  - `IT_CONFIG_FILE`
  - `IT_IDL_CONFIG_FILE`
  - `IT_CONFIG_DIR`
  - `IT_CONFIG_DOMAINS_DIR`
  - `IT_LICENSE_FILE`
  - `IT_ART_ADMIN_PATH`

If you do not set these variables manually, `artix_env` sets them with default values based on `IT_PRODUCT_DIR`. For example, the default for `IT_CONFIG_DIR` on Windows is `IT_PRODUCT_DIR\etc`.

- The `IT_IDL_CONFIG_FILE` environment variable is a required only for an Artix Development installation. All other environment variables are required for both Development and Runtime installations.
- Before `artix_env` sets each environment variable, it checks if the `-preserve` command-line option was supplied when the script was run. This ensures that your preset values are not overwritten. Before using the `-preserve` option, always check the existing values for these variables are set correctly.

CHAPTER 2

Artix Configuration

This chapter introduces the main concepts and components in the Artix runtime configuration (for example, configuration domains, scopes, variables, and data types). It also explains how to use Artix configuration files and the command line to manage your applications.

In this chapter

This chapter includes the following sections:

Artix Configuration Concepts

Overview

Artix is built upon IONA's Adaptive Runtime architecture (ART). Runtime behaviors are established through common and application-specific configuration settings that are applied during application startup. As a result, the same application code can be run, and can exhibit different capabilities, in different configuration environments. This section includes the following:

- Configuration domains.
- Configuration scopes.
- Specifying configuration scopes.
- Configuration namespaces.
- Configuration variables.

Configuration domains

An Artix *configuration domain* is a collection of configuration information in an Artix runtime environment. This information consists of configuration variables and their values. A default Artix configuration is provided when Artix is installed. The default Artix configuration domain file has the following location:

Windows	`%IT_PRODUCT_DIR%\artix\`*`Version`*`\etc\domains\artix.cfg`
UNIX	`$IT_PRODUCT_DIR/artix/`*`Version`*`/etc/domains/artix.cfg`

The contents of this file can be modified to affect aspects of Artix behavior (for example, logging or routing).

Configuration scopes

An Artix configuration domain is subdivided into *configuration scopes*. These are typically organized into a hierarchy of scopes, whose fully-qualified names map directly to ORB names. By organizing configuration variables into various scopes, you can provide different settings for individual services, or common settings for groups of services.

Local configuration scopes

Configuration scopes apply to a subset of services or to a specific service in an environment. For example, the Artix `demo` configuration scope includes example local configuration scopes for demo applications.

Application-specific configuration variables either override default values assigned to common configuration variables, or establish new configuration variables. Configuration scopes are localized through a name tag and delimited by a set of curly braces terminated with a semicolon, for example, *`scopeNameTag`* `{…};`

A configuration scope may include nested configuration scopes. Configuration variables set within nested configuration scopes take precedence over values set in enclosing configuration scopes.

In the `artix.cfg` file, there are several predefined configuration scopes. For example, the `demo` configuration scope includes nested configuration scopes for some of the demo programs included with the product.

Example 1: *Demo Configuration Scope*

```
demo
{
 fml_plugin
 {
     orb_plugins = ["local_log_stream", "iiop_profile",
            "giop", "iiop", "soap", "http", "G2", "tunnel",
            "mq", "ws_orb", "fml"];
 };
 telco
 {
    orb_plugins = ["local_log_stream", "iiop_profile",
                  "giop", "iiop", "G2", "tunnel"];
    plugins:tunnel:iiop:port = "55002";
    poa:MyTunnel:direct_persistent = "true";
    poa:MyTunnel:well_known_address = "plugins:tunnel";

    server
      {
        orb_plugins = ["local_log_stream", "iiop_profile",
                     "giop", "iiop", "ots", "soap", "http", "G2:,
                       "tunnel"];
        plugins:tunnel:poa_name = "MyTunnel";
      };
 };
```

Example 1: *Demo Configuration Scope*

```
tibrv
{
    orb_plugins = ["local_log_stream", "iiop_profile",
                   "giop", "iiop", "soap", "http", "tibrv"];

    event_log:filters = ["*=FATAL+ERROR"];
};
};
```

Note: The `orb_plugins` list is redefined within each configuration scope.

Specifying configuration scopes

To make an Artix process run under a particular configuration scope, you specify that scope using the `-ORBname` parameter. Configuration scope names are specified using the following format

`scope.subscope`

For example, the scope for the `telco` server demo shown in Example 1 is specified as `demo.telco.server`. During process initialization, Artix searches for a configuration scope with the same name as the `-ORBname` parameter.

There are two ways of supplying the `-ORBname` parameter to an Artix process:

- Pass the argument on the command line.
- Specify the `-ORBname` as the third parameter to `IT_Bus::init()`.

For example, to start an Artix process using the configuration specified in the `demo.tibrv` scope, you could start the process use the following syntax:

```
<processName> [application parameters] -ORBname demo.tibrv
```

Alternately, you could use the following code to initialize the Artix bus:

```
IT_Bus::init (argc, argv, "demo.tibrv");
```

For more details, see "Command Line Configuration" on page 21.

If a corresponding scope is not located, the process starts under the highest level scope that matches the specified scope name. If there are no scopes that correspond to the `ORBname` parameter, the Artix process runs under the default global scope. For example, if the nested `tibrv` scope does not exist, the Artix process uses the configuration specified in the `demo` scope; if the `demo` scope does not exist, the process runs under the default global scope.

Configuration namespaces

Most configuration variables are organized within namespaces, which group related variables. Namespaces can be nested, and are delimited by colons (`:`). For example, configuration variables that control the behavior of a plug-in begin with `plugins:` followed by the name of the plug-in for which the variable is being set. For example, to specify the port on which the Artix standalone service starts, set the following variable:

```
plugins:artix_service:iiop:port
```

To set the location of the routing plug-in's contract, set the following variable:

```
plugins:routing:wsdl_url
```

Configuration variables

Configuration data is stored in variables that are defined within each namespace. In some instances, variables in different namespaces share the same variable names.

Variables can also be reset several times within successive layers of a configuration scope. Configuration variables set in narrower configuration scopes override variable settings in wider scopes. For example, a `company.operations.orb_plugins` variable would override a `company.orb_plugins` variable. Plug-ins specified at the `company` scope would apply to all processes in that scope, except those processes that belong specifically to the `company.operations` scope and its child scopes.

Configuration Data Types

Overview

Each Artix configuration variable has an associated data type that determines the variable's value.

Data types can be categorized as follows:

- Primitive types
- Constructed types

Primitive types

Artix supports the following three primitive types:

- `boolean`
- `double`
- `long`

Constructed types

Artix supports two constructed types: `string` and `ConfigList` (a sequence of strings).

- In an Artix configuration file, the `string` character set is ASCII.
- The `ConfigList` type is simply a sequence of `string` types. For example:

```
orb_plugins = ["local_log_stream", "iiop_profile",
   "giop","iiop"];
```

Artix Configuration Files

Overview

This section explains how to use Artix configuration files to manage applications in your environment. It includes the following:

- "Default configuration file".
- "Importing configuration settings".
- "Working with multiple installations".
- "Using symbols as configuration file parameters".

Default configuration file

The Artix configuration domain file contains all the configuration settings for the domain. The default configuration domain file is found in the following location:

Windows `%IT_PRODUCT_DIR%\artix\`*`Version`*`\etc\domains\artix.cfg`

UNIX `$IT_PRODUCT_DIR/artix/`*`Version`*`/etc/domains/artix.cfg`

You can edit the settings in an Artix configuration file to modify different aspects of Artix behavior (for example, routing, or levels of logging).

Importing configuration settings

You can manually create new Artix configuration domain files to compartmentalize your applications. These new configuration domain files can import information from other configuration domains using an `include` statement in your configuration file.

This provides a convenient way of compartmentalizing your application-specific configuration from the global ART configuration information that is contained in the default configuration domain file. It also means that you can easily revert to the default settings in the default Artix configuration file. Using separate application-specific configuration files is the recommended way of working with Artix configuration.

Example 2 shows an `include` statement that imports the default configuration file. The include statement is typically the first line the configuration file.

Example 2: *Configuration file include statement*

```
include "../../../../../etc/domains/artix.cfg";

my_app_config {
...
}
```

For complete working examples of Artix applications that use this import mechanism, see the configuration files provided with Artix demos. These demo applications are available from the following directory:

InstallDir\artix*Version*\demos

Working with multiple installations

If you are using multiple installations or versions of Artix, you can use your configuration files to help manage your applications as follows:

1. Install each version of Artix into a different directory.
2. Install your applications into their own directory.
3. Copy the `artix.cfg` file from whichever Artix release you want to use into another directory (for example, an application directory).
4. In your application's local configuration file, include the `artix.cfg` file from your copy location.

This enables you to switch between Artix versions by copying the corresponding `artix.cfg` file into a common location. This avoids having to update the directory information in your configuration file whenever you want to switch between Artix versions.

Using symbols as configuration file parameters

You can define arbitrary symbols for use in Artix configuration files, for example:

```
SERVER_LOG = "my_server_log";
```

These symbols can then be reused as parameters in configuration settings, for example:

```
plugins:local_log_stream:filename = SERVER_LOG;
```

You can use configuration symbols to customize your file depending on the environment. This enables you to use the same basic configuration file in different environments (for example, development, test, and production).

Using configuration symbols in a string

You can use symbols within a string using a syntax of `%{`*`SYMBOL_NAME`*`}`. For example, if you define the following symbol:

```
LOG_LEVEL = "FATAL+ERROR+WARNING+INFO_MED+INFO_HI";
```

This can be used within a string as follows:

```
event_log:filters = ["*=%{LOG_LEVEL}"];
```

You can also combine multiple symbols within a string as follows:

```
plugins:local_log_stream:filename = "%{APP_NAME}-%{CLIENT_LOG}";
```

Configuration example

The configuration file in Example 3 contains some user-defined symbols:

Example 3: *Defining Configuration Symbols*

```
#mydomain.cfg

INSTALL_CFG = "../../artix.cfg";

CLIENT_LOG = "my_client.log";
SERVER_LOG = "my_server.log";
APP_NAME = "myapp";
LOG_LEVEL = "FATAL+ERROR+WARNING+INFO_MED+INFO_HI";

include "template.cfg";
```

The configuration file in Example 4 uses the predefined symbols in configuration variable settings:

Example 4: *Using Configuration Symbols*

```
#template.cfg

include INSTALL_CFG

myapps {
  orb_plugins = ["local_log_stream", "soap", "http"];

   server {
     #Simple user-defined symbol.
     plugins:local_log_stream:filename = SERVER_LOG;

     #Using a symbol within a string.
     event_log:filters = ["*=%{LOG_LEVEL}"];
  }

  client {
     #Combining symbols within a string.
     plugins:local_log_stream:filename = "%{APP_NAME}-%{CLIENT_LOG}";
  };
};
```

This example shows a user-defined symbol in an `include` statement. It shows a simple example of using a symbol in an configuration setting, and more complex examples of using symbols in strings.

For details of using configuration symbols on the command line, see "Command Line Configuration" on page 21.

Command Line Configuration

Overview

This section explains how to set configuration variables and user-defined configuration symbols on the command line.

Setting configuration variables

Artix enables you to override configuration variables at runtime by using arguments on the command line. These arguments are then passed to the Artix `IT_Bus::init()` call. Setting configuration variables on the command line takes precedence over variables in a configuration file.

Command-line configuration arguments take the following format:

```
-ORBVariableName Value
```

For example:

```
client -ORBplugins:local_log_stream:filename client.log
   -ORBorb_plugins ["local_log_stream","soap","http"]
   -ORBevent_log:filters ["*=*"]
```

Setting configuration symbols

You can also override user-defined configuration symbols on the command line. Setting configuration symbols on the command line takes precedence over symbols in a configuration file.

For example, you can override the log file name in Example 3 using command-line arguments as follows:

```
client -ORBCLIENT_LOG test2.log
```

This successfully creates a log file named `test2.log`*date*. For more details, see "Using symbols as configuration file parameters" on page 19.

You can also use command-line arguments to pass the value of environment variables to configuration files. For details on setting Artix environment variables, see Chapter 1.

CHAPTER 3

Artix Logging

This chapter describes how to configure Artix logging. It also explains Artix support for Java log4j and SNMP (Simple Network Management Protocol).

In this chapter

This chapter includes the following sections:

Configuring Artix Logging

Overview

Logging in Artix is controlled by the `event_log:filters` configuration variable, and by the log stream plug-ins (for example, `local_log_stream` and `xmlfile_log_stream`).

This section explains how to use these settings to configure logging in Artix, It includes the following:

- "Configuring logging levels".
- "Configuring logging output".
- "Using a rolling log file".
- "Buffering the output stream".
- "Logging severity levels"

Configuring logging levels

You can set the `event_log:filters` configuration variable to provide a wide range of logging levels. The `event_log:filters` variable can be set in your Artix configuration file:

`InstallDir``\artix\`*`Version`*`\etc\domains\artix.cfg`.

Displaying errors

The default `event_log:filters` setting displays errors only:

```
event_log:filters = ["*=FATAL+ERROR"];
```

Displaying warnings

The following setting displays errors and warnings only:

```
event_log:filters = ["*=FATAL+ERROR+WARNING"];
```

Displaying request/reply messages

Adding `INFO_MED` causes all request/reply messages to be logged (for all transport buffers):

```
event_log:filters = ["*=FATAL+ERROR+WARNING+INFO_MED"];
```

Displaying trace output

The following setting displays typical trace statement output (without the raw transport buffers being printed):

```
event_log:filters = ["*=FATAL+ERROR+WARNING+INFO_HI"];
```

Displaying all logging

The following setting displays all logging:

```
event_log:filters = ["*=*"];
```

The default configuration settings enable logging of only serious errors and warnings. For more exhaustive information, select a different filter list at the default scope, or include a more expansive `event_log:filters` setting in your configuration scope.

Configuring logging output

In addition to setting the event log filter, you must ensure that a log stream plug-in is set in your `artix.cfg` file. These include the `local_log_stream`, which sends logging to a text file, and the `xmlfile_log_stream`, which directs logging to an XML file. The `xmlfile_log_stream` is set by default.

Using text log files

To configure the `local_log_stream`, set the following variables in your configuration file:

```
//Ensure these plug-ins exist in your orb_plugins list
orb_plugins = ["local_log_stream", ... ];

//Optional text filename
plugins:local_log_stream:filename = "/var/mylocal.log";
```

If you do not specify a text log file name, logging is sent to `stdout`.

Using XML log files

To configure the `xmlfile_log_stream`, set the following variables in your configuration file:

```
//Ensure this plug-in is in your orb_plugins list
orb_plugins = ["xmlfile_log_stream", ... ];

// Optional filename; can be qualified.
plugins:xmlfile_log_stream:filename = "artix_logfile.xml";

// Optional process ID added to filename (default is false).
plugins:xmlfile_log_stream:use_pid = "false";
```

You must ensure that your application can detect the configuration settings for the log stream plug-ins. You can either set them at the global scope, or configure a unique scope for use by your application, for example:

```
IT_Bus::init(argc, argv, "demo.myscope");
```

This enables you to place the necessary configuration in the `demo.myscope` scope.

Note: The `xmlfile_log_stream` plug-in is included in the default `orb_plugins` list, but not in the `orb_plugins` lists in some demo configuration scopes. To enable logging to an XML file for the applications that you develop, include this plug-in your `orb_plugins` list.

Using a rolling log file

You can specify that a logging plug-in creates a new log file each day to prevent the log file from growing indefinitely. In this model, the stream appends the current date to the configured filename. This produces a complete filename, for example:

```
/var/adm/artix.log.02172005
```

A new file begins with the first event of the day and ends at 23:59:59 each day. The default behavior is `true`.

Text rolling log files

To disable rolling file behavior for a text log file, set the following configuration variable to `false`:

```
plugins:local_log_stream:rolling_file = "false";
```

XML rolling log files

To disable rolling file behavior for an XML log file, set the following configuration variable to `false`:

```
plugins:xmlfile_log_stream:rolling_file = "false";
```

Buffering the output stream

You can also set the output stream to a buffer before it writes to a local log file. To specify this behavior, use either of the following variables:

```
plugins:local_log_stream:buffer_file
plugins:xmlfile_log_stream:buffer_file
```

When set to `true`, by default, the buffer is output to a file every 1000 milliseconds when there are more than 100 messages logged. This log interval and number of log elements can also be configured.

Note: To ensure that the log buffer is sent to the log file, you must always shutdown your applications correctly.

For example, the following configuration writes the log output to a log file every 400 milliseconds if there are more than 20 log messages in the buffer.

Using text log files

```
plugins:local_log_stream:filename = "/var/adm/artix.log";
plugins:local_log_stream:buffer_file = "true";
plugins:local_log_stream:milliseconds_to_log = "400";
plugins:local_log_stream:log_elements = "20";
```

Using XML log files

```
plugins:xml_log_stream:filename = "/var/adm/artix.xml";
plugins:xml_log_stream:buffer_file = "true";
plugins:xml_log_stream:milliseconds_to_log = "400";
plugins:xml_log_stream:log_elements = "20";
```

Logging severity levels

Artix supports the following levels of log message severity:

- Information
- Warning
- Error
- Fatal error

Information

Information messages report significant non-error events. These include server startup or shutdown, object creation or deletion, and details of administrative actions.

Information messages provide a history of events that can be valuable in diagnosing problems. Information messages can be set to low, medium, or high verbosity.

Warning

Warning messages are generated when Artix encounters an anomalous condition, but can ignore it and continue functioning. For example, encountering an invalid parameter, and ignoring it in favor of a default value.

Error

Error messages are generated when Artix encounters an error. Artix might be able to recover from the error, but might be forced to abandon the current task. For example, an error message might be generated if there is insufficient memory to carry out a request.

Fatal error

Fatal error messages are generated when Artix encounters an error from which it cannot recover. For example, a fatal error message is generated if Artix cannot find its configuration file.

Table 3 shows the syntax used by the `event_log:filters` variable to specify Artix logging severity levels.

Table 3: *Artix Logging Severity Levels*

Severity Level	Description
`INFO_LO[W]`	Low verbosity informational messages.
`INFO_MED[IUM]`	Medium verbosity informational messages.
`INFO_HI[GH]`	High verbosity informational messages.
`INFO_ALL`	All informational messages.
`WARN[ING]`	Warning messages.
`ERR[OR]`	Error messages.
`FATAL[_ERROR]`	Fatal error messages.
`*`	All messages.

Configuring Artix Logging Subsystems

Overview

You can also use the `event_log:filters` configuration variable to set fine-grained logging for specified Artix logging subsystems. For example, you can set logging for the Artix core, specific transports, bindings, or services.

Artix logging subsystems

Artix logging subsystems are organized into a hierarchical tree, with the `IT_BUS` subsystem at the root. Example logging subsystems include the following:

```
IT_BUS.CORE
IT_BUS.TRANSPORT.HTTP
IT_BUS.BINDING.SOAP
IT_BUS.BINDING.CORBA
IT_BUS.BINDING.CORBA.RUNTIME
```

Subsystem filter syntax

The `event_log:filters` variable takes a list of filters, where each filter sets logging for a specified subsystem using the following format:

```
Subsystem=SeverityLevel[+SeverityLevel]...
```

`Subsystem` is the name of the Artix subsystem that reports the messages; while *`SeverityLevel`* represents the severity levels that are logged by that subsystem. For example, the following filter specifies that only errors and fatal errors for the HTTP transport should be reported:

```
IT_BUS.TRANSPORT.HTTP=ERR+FATAL
```

In a configuration file, `event_log:filters` is set as follows:

```
event_log:filters=["LogFilter"[,"LogFilter"]...]
```

The following entry in a configuration file explicitly sets severity levels for a list of subsystem filters:

```
event_log:filters=["IT_BUS=FATAL+ERROR",
                   "IT_BUS.BINDING.CORBA=WARN+FATAL+ERROR"];
```

Setting the Artix bus pre-filter

The Artix bus pre-filter provides filtering of log messages that are sent to the `EventLog` before they are output to the `LogStream`. This enables you to minimize the time spent generating log messages that will be ignored. For example:

```
event_log:filters:bus:pre_filter = "WARN+ERROR+FATAL";

event_log:filters = ["IT_BUS=FATAL+ERROR", "IT_BUS.BINDING=*"];
```

In this example, only `WARNING`, `ERROR` and `FATAL` priority log messages are sent to the `EventLog`. This means that no processing time is wasted generating strings for `INFO` log messages. The `EventLog` then only sends `FATAL` and `ERROR` log messages to the `LogStream` for the `IT_BUS` subsystem.

Note: `event_log:filters:bus:pre_filter` defaults to `*` (all messages). You should set this variable to improve performance.

Setting logging for specific subsystems

You can set logging filters for specific Artix subsystems. A subsystem with no configured filter value implicitly inherits the value of its parent. The default value at the root of the tree ensures that each node has an implicit filter value. For example:

```
event_log:filters = ["IT_BUS=FATAL+ERROR",
                     "IT_BUS.BINDING.CORBA=WARN+FATAL+ERROR"];
```

This means that all subsystems under `IT_BUS` have a filter of `FATAL+ERROR`, except for `IT_BUS.BINDING.CORBA`, `IT_BUS.BINDING.CORBA.WSDL` and `IT_BUS.BINDING.CORBA.RUNTIME`, which have `WARN+FATAL+ERROR`.

Setting multiple subsystems with a single filter

Using the `IT_BUS` subsystem means you can adjust the logging for Artix subsytems with a single filter. For example, you can turn off logging for the tunnel transport (`IT_BUS.TRANSPORT.TUNNEL=FATAL`) and/or turn up logging for the HTTP transport (`IT_BUS.TRANSPORT.HTTP=INFO_LOW+...`), as show in the following example:

```
event_log:filters= ["IT_BUS=FATAL+ERROR",
                    "IT_BUS.TRANSPORT.TUNNEL=FATAL",
                   "IT_BUS.TRANSPORT.HTTP=INFO_LOW+INFO_HI+WARN"];
```

Configuring service-based logging

You can use Artix service subsystems to log for Artix services, such as the locator, and also for services that you have developed. This can be useful when you are running many services, and need to filter services that are particular noisy. Using service-based logging involves some performance overheads and extra configuration. This feature is disabled by default.

To enable logging for specific services, perform the following steps:

1. Set the following configuration variables:

```
event_log:log_service_names:active = "true";

event_log:log_service_names:services = ["ServiceName1",
   "ServiceName2"];
```

2. Set the event log filters as appropriate, for example:

```
event_log:filters = ["IT_BUS=FATAL+ERROR",
    "ServiceName1=WARN+ERROR+FATAL", "ServiceName2=ERROR+FATAL",
   "ServiceName2.IT_BUS.BINDING.CORBA=INFO+WARN+ERROR+FATAL"
 ];
```

In these examples, the service name must be specified in the following format:

"{*NamespaceURI*}*LocalPart*"

For example:

```
"{http://www.my-company.com/bus/tests}SOAPHTTPService"
```

Setting parameterized configuration

The following example shows setting service-based logging in your application using the `-ORBevent_log:filters` parameter:

```
const char* bus_argv[] = {"-ORBname", "my_spp_logging",
                          "-ORBevent_log:filters", "{IT_BUS=ERR},
                    {{http://www.my-company/my_app}SOAPHTTPService.IT_BUS.BINDING.SOAP=INFO}"
```

Logging per bus

For C++ applications, you can configure logging per bus by specifying your logging configuration in an application-specific scope. However, you must also specify logging per bus in your server code, for example:

- Include the `it_bus/bus_logger.h` file.
- Pass a valid bus to the `BusLogger` (for example, using `BusLogger` macros, such as `IT_INIT_BUS_LOGGER_MEM`).

For full details on how to specify that logging statements are sent to a particular Artix bus, see Developing Artix Plug-ins with C++.

Configuring Log4J Logging

Overview

For Artix Java applications, you also have the option of using log4J, which is a standard Java logging tool. This enables you to control Artix logging with the same logging tool used by Java applications. This section includes the following:

- "Specifying the log4j plug-in".
- "Setting the log4j properties file".

Note: log4j logging overrides Artix logging. Settings in the `LogConfig.properties` file completely override settings in the `artix.cfg` file.

Specifying the log4j plug-in

You must first add the `log4j_log_stream` plug-in to your Artix `orb_plugins` list. For example:

```
orb_plugins = ["log4j_log_stream", "iiop_profile", "giop",
   "iiop"];
```

The `log4j_log_stream` plug-in reroutes all Artix logging to log4j.

Setting the log4j properties file

When using log4j with Artix, the `LogConfig.properties` file controls your Artix logging settings. This file is located in the following directory:

`InstallDir``/artix/`*`Version`*`/etc`

To enable log4j logging, delete the comment symbol (`#`) in the following line:

```
#log4j.logger.com.iona=DEBUG
```

In this file, all Artix logging is set to a root logger named `com.iona`. You can not specify to log only `DEBUG` level messages like you can Artix logging. Instead, specifying a logging level means to log all messages with that level or higher. For example, setting the log level to `DEBUG` means to log all `DEBUG`, `WARNING`, `ERROR`, and `FATAL` messages.

Using log4j with your Java applications

If you wish to combine the log4J logging in your Java application with log4j logging in Artix, you must initialize log4j with the `LogConfig.properties` file in your Java application code.

However, you can still use your own properties file to initialize log4j, and you do no have to use `LogConfig.properties`.

Further information

For more information about using log4j, see the Apache documentation at:

`http://logging.apache.org/log4j/docs/documentation.html`

Configuring SNMP Logging

SNMP

*Simple Network Management Protocol (*SNMP) is the Internet standard protocol for managing nodes on an IP network. SNMP can be used to manage and monitor all sorts of equipment (for example, network servers, routers, bridges, and hubs).

The Artix SNMP `LogStream` plug-in uses the open source library `net-snmp` (v.5.0.7) to emit SNMP v1/v2 traps. For more information on this implementation, see http://sourceforge.net/projects/net-snmp/. To obtain a freeware SNMP Trap Receiver, visit http://www.ncomtech.com.

Artix Management Information Base (MIB)

A *MIB file* is a database of objects that can be managed using SNMP. It has a hierarchical structure, similar to a DOS or UNIX directory tree. It contains both pre-defined values and values that can be customized. The Artix MIB is shown below:

Example 5: *Artix MIB*

```
IONA-ARTIX-MIB DEFINITIONS  ::= BEGIN

 IMPORTS
        MODULE-IDENTITY, OBJECT-TYPE,
       Integer32, Counter32,
       Unsigned32,
       NOTIFICATION-TYPE              FROM   SNMPv2-SMI
       DisplayString                  FROM   RFC1213-MIB
;

-- v2 s/current/current


 iona OBJECT IDENTIFIER ::= { iso(1) org(3) dod(6) internet(1) private(4) enterprises(1) 3027 }

 ionaMib MODULE-IDENTITY
 LAST-UPDATED "200303210000Z"

 ORGANIZATION "IONA Technologies PLC"
```

Example 5: *Artix MIB*

```
CONTACT-INFO
            "
               Corporate Headquarters
               Dublin Office
               The IONA Building
               Shelbourne Road
               Ballsbridge
               Dublin 4 Ireland
               Phone: 353-1-662-5255
               Fax: 353-1-662-5244

               US Headquarters
               Waltham Office
               200 West Street 4th Floor
               Waltham, MA 02451
               Phone: 781-902-8000
               Fax: 781-902-8001

               Asia-Pacific Headquarters
               IONA Technologies Japan, Ltd
               Akasaka Sanchome Bldg.
               7F 3-21-16 Akasaka, Minato-ku,
               Tokyo, Japan 107-0052
               Tel: +81 3 3560 5611
               Fax: +81 3 3560 5612
               E-mail: support@iona.com
            "
DESCRIPTION
       "This MIB module defines the objects used and format of SNMP traps that are generated
        from the Event Log for Artix based systems from IONA Technologies"

::= { iona 1 }
```

Example 5: *Artix MIB*

```
--                      iona(3027)

--                        |
--                      ionaMib(1)
--                        |
--                ________________________________________
--               |                 |                      |
--           orbix3(2)        IONAAdmin (3)          Artix (4)
-                                                       |
--                                                 --------------------
--                                                |                    |
--                                ArtixEventLogMibObjects(0)  ArtixEventLogMibTraps (1)
--                                    |                                |
--               ----------------------------------------       -----------------------
--                                |- eventSource (1)                  |- ArtixbaseTrapDef (1)
--                                |- eventId (2)
--                                |- eventPriority (3)
--                                |- timeStamp (4)
--                                |- eventDescription (5)



Artix                           OBJECT IDENTIFIER  ::= { ionaMib 4 }
ArtixEventLogMibObjects         OBJECT IDENTIFIER  ::= { Artix 0 }
ArtixEventLogMibTraps           OBJECT IDENTIFIER  ::= { Artix 1 }
ArtixBaseTrapDef                OBJECT IDENTIFIER  ::= { ArtixEventLogMibTraps 1 }


-- MIB variables used as varbinds
eventSource         OBJECT-TYPE
   SYNTAX      DisplayString (SIZE(0..255))
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
       "The component or subsystem which generated the event."
    ::= { ArtixEventLogMibObjects 1 }
```

Example 5: *Artix MIB*

```
eventId        OBJECT-TYPE
   SYNTAX      INTEGER
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
       "The event id for the subsystem which generated the event."

   ::= { ArtixEventLogMibObjects 2 }

eventPriority      OBJECT-TYPE
   SYNTAX          INTEGER
   MAX-ACCESS      not-accessible
   STATUS          current
   DESCRIPTION
       "The severity level of this event.  This maps to IT_Logging::EventPriority types.  All
        priority types map to four general types: INFO (I), WARN (W), ERROR (E), FATAL_ERROR (F)"

   ::= { ArtixEventLogMibObjects 3 }

timeStamp       OBJECT-TYPE
   SYNTAX      DisplayString (SIZE(0..255))
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
       "The time when this event occurred."

   ::= { ArtixEventLogMibObjects 4 }

eventDescription       OBJECT-TYPE
   SYNTAX           DisplayString (SIZE(0..255))
   MAX-ACCESS       not-accessible
   STATUS           current
   DESCRIPTION
       "The component/application description data included with event."

   ::= { ArtixEventLogMibObjects 5 }

-- SNMPv1 TRAP definitions
-- ArtixEventLogBaseTraps   TRAP-TYPE
--    OBJECTS {
--       eventSource,
--       eventId,
--       eventPriority,
```

Example 5: *Artix MIB*

```
--       timestamp,
--       eventDescription
--    }

--    STATUS current
--    ENTERPRISE iona
--    VARIABLES { ArtixEventLogMibObjects }
--    DESCRIPTION  "The generic trap generated from an Artix Event Log."
--    ::= { ArtixBaseTrapDef 1 }

-- SNMPv2 Notification type

 ArtixEventLogNotif   NOTIFICATION-TYPE
    OBJECTS {
       eventSource,
       eventId,
       eventPriority,
       timestamp,
       eventDescription
    }

    STATUS current
    ENTERPRISE iona
    DESCRIPTION  "The generic trap generated from an Artix Event Log."
    ::= { ArtixBaseTrapDef 1 }

END
```

IONA SNMP integration

Events received from various Artix components are converted into SNMP management information. This information is sent to designated hosts as SNMP traps, which can be received by any SNMP managers listening on the hosts. In this way, Artix enables SNMP managers to monitor Artix-based systems.

Artix supports SNMP version 1 and 2 traps only.

Artix provides a log stream plug-in called `snmp_log_stream`. The shared library name of the SNMP plug-in found in the `artix.cfg` file is:

```
plugins:snmp_log_stream:shlib_name = "it_snmp"
```

Configuring the SNMP plug-in

The SNMP plug-in has five configuration variables, whose defaults can be overridden by the user. The availability of these variables is subject to change. The variables and defaults are:

```
plugins:snmp_log_stream:community = "public";

plugins:snmp_log_stream:server    = "localhost";

plugins:snmp_log_stream:port      = "162";

plugins:snmp_log_stream:trap_type = "6";

plugins:snmp_log_stream:oid       = "your IANA number in dotted decimal notation"
```

Configuring the Enterprise Object Identifier

The last plug-in described, `oid`, is the Enterprise Object Identifier. This is assigned to specific enterprises by the Internet Assigned Numbers Authority (IANA). The first six numbers correspond to the prefix: `iso.org.dod.internet.private.enterprise` (`1.3.6.1.4.1`). Each enterprise is assigned a unique number, and can provide additional numbers to further specify the enterprise and product.

For example, the `oid` for IONA is `3027`. IONA has added `1.4.1.0` for Artix. Therefore the complete OID for IONA's Artix is `1.3.6.1.4.1.3027.1.4.1.0`. To find the number for your enterprise, visit the IANA website at http://www.iana.org.

The SNMP plug-in implements the `IT_Logging::LogStream` interface and therefore acts like the `local_log_stream` plug-in.

CHAPTER 4

Using Artix with International Codesets

The Artix SOAP and CORBA bindings enable you to transmit and receive messages in a range of codesets.

In this chapter

This chapter includes the following:

Introduction to International Codesets

Overview

A *coded character set*, or *codeset* for short, is a mapping between integer values and characters that they represent. The best known codeset is ASCII (American Standard Code for Information Interchange). ASCII defines 94 graphic characters and 34 control characters using the 7-bit integer range.

European languages

The 94 characters defined by the ASCII codeset are sufficient for English, but they are not sufficient for European languages, such as French, Spanish, and German.

To remedy the situation, an 8-bit codeset, ISO 8859-1, also known as Latin-1, was invented. The lower 7-bit portion is identical to ASCII. The extra characters in the upper 8-bit range cover those languages used widely in Western Europe.

Many other codesets are defined under ISO 8859 framework. These cover languages in other regions of Europe, as well as Russian, Arabic and Hebrew. The most recent addition is ISO 8859-15, which is a revision of ISO 8859-1. This adds the Euro currency symbol and other letters while removing less used characters.

For further information about ISO-8859-x encoding, see the following web site: "The ISO 8859 Alphabet Soup" (http://wwwwbs.cs.tu-berlin.de/user/czyborra/charsets/).

Ideograms

Asian countries that use ideograms in their writing systems need more characters than fit in an 8-bit integer. Therefore, they invented double-byte codesets, where a character is represented by a bit pattern of 2 bytes.

These languages also needed to mix the double-byte codeset with ASCII in a single text file. So, *character encoding schemas*, or simply *encodings*, were invented as a way to mix characters of multiple codesets.

Some of the popular encodings used in Japan include:

- Shift JIS
- Japanese EUC
- Japanese ISO 2022

Unicode

Unicode is a new codeset that is gaining popularity. It aims to assign a unique number, or code point, to every character that exists (and even once existed) in all languages. To accomplish this, Unicode, which began as a double-byte codeset, has been expanded into a quadruple-byte codeset.

Unicode, in pure form, can be difficult to use within existing computer architectures, because many APIs are byte-oriented and assume that the byte value `0` means the end of the string.

For this reason, Unicode Transformation Format for 8-bit channel, or UTF-8, is frequently used. When browsers list “Unicode” in its encoding selection menu, they usually mean UTF-8, rather than the pure form of Unicode.

For more information about Unicode and its variants, visit Unicode (http://www.unicode.org/).

Charset names

To address the need for computer networks to connect different types of computers that use different encodings, the Internet Assigned Number Authority, or IANA, has a registry of encodings at http://www.iana.org/assignments/character-sets.

IANA names are used by many Internet standards including MIME, HTML, and XML.

Table 4 lists IANA names for some popular charsets.

Table 4: *IANA Charset Names*

IANA Name	Description
US-ASCII	7-bit ASCII for US English
ISO-8859-1	Western European languages
UTF-8	Byte oriented transformation of Unicode
UTF-16	Double-byte oriented transformation of Unicode
Shift_JIS	Japanese DOS & Windows
EUC-JP	Japanese adaptation of generic EUC scheme, used in UNIX

Table 4: *IANA Charset Names*

IANA Name	Description
ISO-2022-JP	Japanese adaptation of generic ISO 2022 encoding scheme

Note: IANA names are case insensitive. For example, US-ASCII can be spelled as us-ascii or US-ascii.

CORBA names

In CORBA, codesets are identified by numerical values registered with the Open Group's registry, OSF Codeset Registry: ftp://ftp.opengroup.org/pub/code_set_registry/code_set_registry1.2g.txt.

Java names

Java has its own names for charsets. For example, ISO-8859-1 is named `ISO8859_1`, Shift_JIS is named `SJIS`, and UTF-8 is named `UTF8`.

Java is transitioning to IANA charset names, to be aligned with MIME. JDK 1.3 and above recognizes both names.

Note: Artix uses IANA charset names even for CORBA codesets.

Working with Codesets using SOAP

Overview

Because SOAP messages are XML based, they are composed primarily of character data that can be encoded using any of the existing codesets. If the applications in a system are using different codesets, they can not interpret the messages passing between them. The Artix SOAP plug-in uses the XML prologue of SOAP messages to ensure that it stays in sync with the applications that it interacts with.

Making requests

When making requests or broadcasting a message, the SOAP plug-in determines the codeset to use from its Artix configuration scope. You can set the SOAP plug-in's character encoding using the `plugins:soap:encoding` configuration variable. This takes the IANA name of the desired codeset. The default value is `UTF-8`.

For more information on this configuration variable, see "SOAP Plug-in" on page 143. For general information on configuring Artix applications, see "Getting Started" on page 1.

Responding to SOAP requests

When an Artix server receives a SOAP message, it checks the XML prologue to see what encoding codeset the message uses. If the XML prologue specifies the message's codeset, Artix uses the specified codeset to read the message and to write out its response to the request. For example, an Artix server that receives a request with the XML prologue shown in Example 6 decodes the message using `UTF-16` and encodes its response using `UTF-16`.

Example 6: *XML Prologue*

```
<?xml version="1.0" encoding="UTF-16"?>
```

If an Artix server receives a SOAP message where the XML prologue does not include the `encoding` attribute, the server will use whatever default codeset is specified in its configuration to decode the message and encode the response.

Working with Codesets using CORBA

Overview

The Artix CORBA plug-in supports both wide characters and narrow characters to accommodate an array of codesets. It also supports *codeset negotiation*. Codeset negotiation is the process by which two CORBA processes which use different *native codeset*s determine which codeset to use as a *transmission codeset*. Occasionally, the process requires the selection of a *conversion codeset* to transmit data between the two processes. The algorithm is defined in section 13.10.2.6 of the CORBA specification (http://www.omg.org/cgi-bin/apps/doc?formal/02-12-06.pdf).

Note: For CORBA programing in Java, you can specify a codeset other than the true native codeset.

Native codeset

A native codeset (NCS) is a codeset that a CORBA program speaks natively.

For Java, this is UTF-8 (`0x05010001`) for `char` and `String`, and UTF-16 (`0x00010109`) for `wchar` and `wstring`.

For C and C++, this is the encoding that is set by `setlocale()`, which in turn depends on the `LANG` and `LC_xxxx` environment variables.

You can configure the Artix CORBA plug-in's native codesets using the configuration variables listed in Table 5.

Table 5: *Configuration Variables for CORBA Native Codeset*

Configuration Variable	Description
`plugins:codeset:char:ncs`	Specifies the native codeset for narrow character and string data.
`plugins:codeset:wchar:ncs`	Specifies the native codeset for wide character and string data.

Conversion codeset

A conversion codeset (CCS) is an alternative codeset that the application registers with the ORB. More than one CCS can be registered for each of the narrow and wide interfaces. CCS should be chosen so that the expected input data can be converted to and from the native codeset without data loss. For example, Windows code page 1252 (`0x100204e4`) can be a conversion codeset for ISO-8859-1 (`0x00010001`), assuming only the common characters between the two codesets are used in the data.

You can configure the Artix CORBA plug-in's list of conversion codesets using the configuration variables listed in Table 6.

Table 6: *Configuration Variables for CORBA Conversion Codesets*

Configuration Variable	Description
`plugins:codeset:char:ccs`	Specifies the list of conversion codesets for narrow character and string data.
`plugins:codeset:wchar:ccs`	Specifies the list of conversion codesets for wide character and string data.

Transmission codeset

A transmission codeset (TCS) is the codeset agreed upon after the codeset negotiation. The data on the wire uses this codeset. It is either the native codeset, one of the conversion codesets, or UTF-8 for the narrow interface and UTF-16 for the wide interface.

Negotiation algorithm

Codeset negotiation uses the following algorithm to determine which codeset to use in transferring data between client and server:

1. If the client and server are using the same native codeset, no translation is required.
2. If the client has a converter to the server's codeset, the server's native codeset is used as the transmission codeset.
3. If the client does not have an appropriate converter and the server does have a converter to the client's codeset, the client's native codeset is used as the transmission codeset.

4. If neither the client nor the server has an appropriate converter, the server ORB tries to find a conversion codeset that both server and client can convert to and from without loss of data. The selected conversion codeset is used as the transmission codeset.
5. If no conversion codeset can be found, the server ORB determines if using UTF-8 (narrow characters) or UTF-16 (wide characters) will allow communication between the client and server without loss of data. If UTF-8 or UTF-16 is acceptable, it is used as the transmission codeset. If not, a `CODESET_INCOMPATIBLE` exception is raised.

Codeset compatibility

The final steps involve a compatibility test, but the CORBA specification does not define when a codeset is compatible with another. The compatibility test algorithm employed in Orbix is outlined below:

1. ISO 8859 Latin-*n* codesets are compatible.
2. UCS-2 (double-byte Unicode), UCS-4 (four-byte Unicode), and UTF-x are compatible.
3. All other codesets are not compatible with any other codesets.

This compatibility algorithm is subject to change without notice in future releases. Therefore, it is best to configure the codeset variables as explicitly as possible to reduce dependency on the compatibility algorithm.

Working with Codesets using Fixed Length Records

Overview

Artix fixed record length support enables Artix to interact with mainframe systems using COBOL. For example, many COBOL applications send fixed length record data over WebSphere MQ.

Artix provides a fixed binding that maps logical messages to concrete fixed record length messages. This binding enables you to specify attributes such as encoding style, justification, and padding character.

Encoding attribute

The Artix fixed binding provides an optional `encoding` attribute for both its `fixed:binding` and `fixed:body` elements. The `encoding` attribute specifies the codeset used to encode the text data. Valid values are any IANA codeset name. See http://www.iana.org/assignments/character-sets for details.

The `encoding` attribute for the `fixed:binding` element is a global setting; while the `fixed:body` attribute is per operation. Both settings are optional. If you do not set either, the default value is `UTF-8`.

For more details, see `fixed-binding.xsd`, available in *`InstallDir`*`\iona\artix\`*`Version`*`\schemas`.

Fixed binding example

The following WSDL example shows a fixed binding with `encoding` attributes for `fixed:body` elements. This binding includes two operations, `echoVoid` and `echoString`.

Example 7: *Fixed Length Record Binding*

```
<?xml version="1.0" encoding="UTF-8"?>
<definitions xmlns="http://schemas.xmlsoap.org/wsdl/"
   xmlns:fixed="http://schemas.iona.com/bindings/fixed"
   xmlns:http="http://schemas.iona.com/transports/http"
   xmlns:http-conf="http://schemas.iona.com/transports/http/configuration"
   xmlns:iiop="http://schemas.iona.com/transports/iiop_tunnel"
   xmlns:mq="http://schemas.iona.com/transports/mq"
   xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
```

Example 7: *Fixed Length Record Binding*

```
 xmlns:tns="http://www.iona.com/artix/test/I18nBase/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsd1="http://www.iona.com/artix/test/I18nBase" name="I18nBaseService"
targetNamespace="http://www.iona.com/artix/test/I18nBase/"

 <message name="echoString">
     <part name="stringParam0" type="xsd:string"/>
 </message>

 <message name="echoStringResponse">
     <part name="return" type="xsd:string"/>
 </message>

 <message name="echoVoid"/>
 <message name="echoVoidResponse"/>

 <portType name="I18nBasePortType">
     <operation name="echoString">
         <input message="tns:echoString" name="echoString"/>
         <output message="tns:echoStringResponse" name="echoStringResponse"/>
     </operation>
     <operation name="echoVoid">
         <input message="tns:echoVoid" name="echoVoid"/>
         <output message="tns:echoVoidResponse" name="echoVoidResponse"/>
     </operation>
 </portType>

 <binding name="I18nFIXEDBinding" type="tns:I18nBasePortType">
     <fixed:binding/>
     <operation name="echoString">
         <fixed:operation discriminator="discriminator"/>
         <input name="echoString">
             <fixed:body encoding="ISO-8859-1">
                 <fixed:field bindingOnly="true" fixedValue="01" name="discriminator"/>
                 <fixed:field name="stringParam0" size="50"/>
             </fixed:body>
         </input>
         <output name="echoStringResponse">
             <fixed:body encoding="ISO-8859-1">
                 <fixed:field name="return" size="50"/>
             </fixed:body>
         </output>
     </operation>
```

Example 7: *Fixed Length Record Binding*

```
 <operation name="echoVoid">
            <fixed:operation discriminator="discriminator"/>
            <input name="echoVoid">
                <fixed:body>
                    <fixed:field name="discriminator" fixedValue="02" bindingOnly="true"/>
                </fixed:body>
            </input>
            <output name="echoVoidResponse">
                <fixed:body/>
            </output>
        </operation>
    </binding>
</definitions>
```

Further information

For more details on the Artix fixed length binding, see *Designing Artix Solutions*.

Working with Codesets using Message Interceptors

Overview

Artix provides support for codeset conversion for transports that do not have their own concept of headers. For example, IBM Websphere MQ, BEA Tuxedo, and Tibco Rendezvous. This generic support is implemented using an Artix message interceptor and WSDL port extensors.

For example, an Artix C++ client could use Artix Mainframe to access a mainframe system, using a binding for fixed length record over MQ. In this scenario, an Artix message interceptor can be configured to enable codeset conversion between ASCII and EBCDIC (Extended Binary Coded Decimal Interchange Code).

You can enable this codeset conversion simply by editing your WSDL file, or by using accessor methods in your application code. This section explains how to use both of these approaches.

Note: Codeset conversion set in application code takes precedence over the same settings in a WSDL file.

Codeset conversion attributes

This generic support for codeset conversion is implemented using a message interceptor. This message interceptor manipulates the following codeset conversion attributes:

`LocalCodeSet`	Specifies the codeset used locally by a client or server application.
`OutboundCodeSet`	Specifies the codeset used by the application for outgoing messages.
`InboundCodeSet`	Specifies the codeset used by the application for incoming messages.

You can specify these attributes to convert client-side requests and server-side responses. All three attributes are optional.

Configuring codeset conversion in a WSDL file

You can configure codeset conversion by setting the codeset conversion attributes in a WSDL file. Example 8 shows the contents of the Artix internationalization schema (`i18n-context.xsd`).

Example 8: *Artix i18n Schema*

```
<?xml version="1.0" encoding="UTF-8" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
           targetNamespace="http://schemas.iona.com/bus/i18n/context"
           xmlns:i18n-context="http://schemas.iona.com/bus/i18n/context"
           elementFormDefault="qualified"
           attributeFormDefault="unqualified">

  <xs:import namespace = "http://schemas.xmlsoap.org/wsdl/"
   schemaLocation="wsdl.xsd"/>

  <xs:element name="client" type="i18n-context:ClientConfiguration" />

  <xs:complexType name="ClientConfiguration">

   <xs:annotation>
       <xs:documentation> I18n Client Context Information
       </xs:documentation>
   </xs:annotation>

    <xs:complexContent>
      <xs:extension base="wsdl:tExtensibilityElement" >
        <xs:attribute name="LocalCodeSet" type="xs:string" use="optional" />
        <xs:attribute name="OutboundCodeSet" type="xs:string" use="optional" />
        <xs:attribute name="InboundCodeSet" type="xs:string" use="optional" />
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
```

Example 8: *Artix i18n Schema*

```
 <xs:element name="server" type="i18n-context:ServerConfiguration"/>

  <xs:complexType name="ServerConfiguration" >
   <xs:annotation>
       <xs:documentation> I18n Server Context Information
       </xs:documentation>
   </xs:annotation>

    <xs:complexContent>
      <xs:extension base="wsdl:tExtensibilityElement" >
        <xs:attribute name="LocalCodeSet" type="xs:string" use="optional" />
        <xs:attribute name="OutboundCodeSet" type="xs:string" use="optional" />
        <xs:attribute name="InboundCodeSet" type="xs:string" use="optional" />
      </xs:extension>
    </xs:complexContent>

  </xs:complexType>

</xs:schema>
```

The Artix internationalization message interceptor uses this schema as a port extensor. This enables you to configure codeset conversion attributes in a WSDL file.

Client/server WSDL example

The following example shows codeset conversion settings for a client and a server application specified in a sample WSDL file:

Example 9: *i18n Specified in a WDSL File*

```
<?xml version="1.0" encoding="UTF-8"?>
<definitions name="I18nBaseService"
   targetNamespace="http://www.iona.com/artix/test/I18nBase/"
    xmlns="http://schemas.xmlsoap.org/wsdl/"
    xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
    xmlns:tns="http://www.iona.com/artix/test/I18nBase/"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:mq="http://schemas.iona.com/transports/mq"
    xmlns:http="http://schemas.iona.com/transports/http"
    xmlns:http-conf="http://schemas.iona.com/transports/http/configuration"
    xmlns:fixed="http://schemas.iona.com/bindings/fixed"
    xmlns:i18n-context="http://schemas.iona.com/bus/i18n/context"
    xmlns:xsd1="http://www.iona.com/artix/test/I18nBase">
```

Example 9: *i18n Specified in a WDSL File*

```
  <import namespace="http://www.iona.com/artix/test/I18nBase"
   location="./I18nServiceBindings.wsdl"/>

    <service name="I18nService">

       <port binding="tns:I18nFIXEDBinding" name="I18nFIXED_HTTPPort">
             <http:address location="http://localhost:0"/>
        <i18n-context:client LocalCodeSet="ISO-8859-1" InboundCodeSet="UTF-8"/>
        <i18n-context:server LocalCodeSet="UTF-8" OutboundCodeSet="ISO-8859-1"/>
       </port>

     <port binding="tns:I18nFIXEDBinding" name="I18nFIXED_MQPort">

       <mq:client QueueManager="MY_DEF_QM" QueueName="MY_FIRST_Q" AccessMode="send"
          ReplyQueueManager="MY_DEF_QM" ReplyQueueName="REPLY_Q"
        CorrelationStyle="messageId copy" />

       <mq:server QueueManager="MY_DEF_QM" QueueName="MY_FIRST_Q"
       ReplyQueueManager="MY_DEF_QM" ReplyQueueName="REPLY_Q" AccessMode="receive"
        CorrelationStyle="messageId copy" />
       <i18n-context:client LocalCodeSet="UTF-8" InboundCodeSet=""/>
       <i18n-context:server LocalCodeSet="ISO-8859-1"/>
     </port>

  </service>

</definitions>
```

This sample WSDL file shows a single service named `I18nService`, with two bindings and two ports named `I18nFIXED_HTTPPort` and `I18nFIXED_MQPort`. The binding in both cases is fixed length record, each with a single operation.

Enabling codeset conversion in application code

You can also enable codeset conversion attributes by calling the following accessor methods in your C++ application code:

```
void setLocalCodeSet(const IT_Bus::String * val);
void setLocalCodeSet(const IT_Bus::String & val);

void setOutboundCodeSet(const IT_Bus::String * val);
void setOutboundCodeSet(const IT_Bus::String & val);

void setInboundCodeSet(const IT_Bus::String * val);
void setInboundCodeSet(const IT_Bus::String & val);
```

An Artix `ContextContainer` in the message interceptor, and the WSDL configuration are checked for each attribute. This is performed during the client's `intercept_invoke()` method and the server's `intercept_dispatch()` method. The client request buffer or server response buffer can be converted to another encoding as needed. This conversion can occur on the outbound or inbound intercept points.

The interceptor refers to the current context on a per-thread basis. For detailed information on Artix contexts, see Developing Artix Applications with C++.

Linking with the context library

The message interceptor uses a common type library of Artix context attributes. The application must be linked with this common library, and with any transports that use this context to set or get attributes. The generated header files for this common library are available in the following directory:

InstallDir\artix*Version*\include\it_bus_pdk\context_attrs

You must ensure that your application links with the context library that contains the generated stub code for `i18n-context.xsd`.

Client code example

Example 10 shows an example of the code that you need to add to your C++ client application:

Example 10: *Accessing i18n in C++ Client Code*

```
void
I18nTest::echoString(
    I18nBaseClient* client, const String& instr)
{
    String outstr;
    try
    {

    // Set the i18n request context to match the fixed binding encoding setting

    IT_Bus::Bus_var bus = client->get_bus();
    ContextRegistry * reg = bus->get_context_registry();

    ContextCurrent & cur = reg->get_current();
    ContextContainer * registered_ctx = cur.request_contexts();

    AnyType & i18n_ctx_info =
    registered_ctx->get_context(IT_ContextAttributes::I18N_INTERCEPTOR_CLIENT_QNAME, true);
    ClientConfiguration & i18n_ctx_cfg = dynamic_cast<ClientConfiguration&> (i18n_ctx_info);

    // Set the Inbound codeset to match the binding encoding

    static const String LOCAL_CODE_SET = "ISO-8859-1";
    i18n_ctx_cfg.setLocalCodeSet(LOCAL_CODE_SET);

    const String & local_codeset = (*i18n_ctx_cfg.getLocalCodeSet());

    client->echoString(instr, outstr);

    // Read the i18n reply context

    registered_ctx = cur.reply_contexts();

    AnyType & i18n_ctx_reply_info =
      registered_ctx->get_context(IT_ContextAttributes::I18N_INTERCEPTOR_CLIENT_QNAME, true);

    const ClientConfiguration & i18n_ctx_reply_cfg =
      dynamic_cast<const ClientConfiguration&> (i18n_ctx_reply_info);
```

Example 10: *Accessing i18n in C++ Client Code*

```
    const String * local_codeset_reply = i18n_ctx_reply_cfg.getLocalCodeSet();
    const String * outbound_codeset_reply = i18n_ctx_reply_cfg.getOutboundCodeSet();
    const String * inbound_codeset_reply = i18n_ctx_reply_cfg.getInboundCodeSet();

    if(local_codeset_reply)
     cout << "client LocalCodeSet reply context:" << local_codeset_reply->c_str() << endl;
    if(outbound_codeset_reply)
     cout << "client OutboundCodeSet reply context:"<< outbound_codeset_reply->c_str << endl;
    if(inbound_codeset_reply)
     cout << "client InboundCodeSet reply context" << inbound_codeset_reply->c_str() << endl;
    }

    catch (IT_Bus::ContextException& ce)
    {
    ...
    }
    catch (IT_Bus::Exception& ex)
    {
    ...
    }
    catch (...)
    {
    ...
    }
}
```

Server code example

Example 10 shows example of the code that you need to add to your C++ servant application.

Example 11: *Accessing i18n in C++ Server Code*

```
void
I18nServiceImpl::echoString(
    const String& stringParam0,
    String & var_return) IT_THROW_DECL((IT_Bus::Exception))
{

    var_return = stringParam0;
```

Example 11: *Accessing i18n in C++ Server Code*

```
try
{
// Read the i18n reply context

ContextRegistry * reg = m_bus->get_context_registry();

ContextCurrent & cur = reg->get_current();
ContextContainer * registered_ctx = cur.request_contexts();

AnyType & i18n_ctx_info =
registered_ctx->get_context(IT_ContextAttributes::I18N_INTERCEPTOR_SERVER_QNAME, false);
const ServerConfiguration & i18n_ctx_cfg =
dynamic_cast<const ServerConfiguration&> (i18n_ctx_info);

const String * local_codeset = i18n_ctx_cfg.getLocalCodeSet();
const String * outbound_codeset = i18n_ctx_cfg.getOutboundCodeSet();
const String * inbound_codeset = i18n_ctx_cfg.getInboundCodeSet();

if(local_codeset)
  cout << "server LocalCodeSet request context:" << local_codeset->c_str() << endl;
if(outbound_codeset)
  cout << "server OutboundCodeSet request context:" << outbound_codeset->c_str() << endl;
if(inbound_codeset)
  cout << "server InboundCodeSet request context:" << inbound_codeset->c_str() << endl;

// Add code to change the reply context

registered_ctx = cur.reply_contexts();

AnyType & i18n_reply_ctx =
registered_ctx->get_context(IT_ContextAttributes::I18N_INTERCEPTOR_SERVER_QNAME, true);

ServerConfiguration & i18n_reply_ctx_cfg =
 dynamic_cast<ServerConfiguration&> (i18n_reply_ctx);

// Set the local codeset to match the binding encoding

static const String LOCAL_CODE_SET = "ISO-8859-1";
i18n_reply_ctx_cfg.setLocalCodeSet(LOCAL_CODE_SET);

String & set_local_context = (*i18n_reply_ctx_cfg.getLocalCodeSet());

assert(set_local_context == LOCAL_CODE_SET);
}
```

Example 11: *Accessing i18n in C++ Server Code*

```
   catch (IT_Bus::ContextException& ex)
    {
     cout << "Error with server context" << ex.message() << endl;
    }
  catch (IT_Bus::Exception& ex)
    {
     cout << "Error with server context" << ex.message() << endl;
    }
  catch (...)
    {
     cout << "Unknown Error with server context" << endl;
    }
}
```

Artix configuration settings

Finally, you must also enable the i18n message interceptor in your Artix configuration file (`artix.cfg`). Example 12 shows the required settings:

Example 12: *Artix Configuration File Settings*

```
// Add to a demo/application scope.
interceptor{
    binding:artix:client_message_interceptor_list = "i18n-context:I18nInterceptorFactory";

    binding:artix:server_message_interceptor_list = "i18n-context:I18nInterceptorFactory";

    orb_plugins = ["xmlfile_log_stream", "i18n_interceptor"];

    event_log:filters = ["*=WARN+ERROR+FATAL"];
};
```

Further information

For more information details on writing Artix C++ applications and on Artix contexts, see Developing Artix Applications with C++.

Routing with International Codesets

Overview

When routing between applications, Artix attempts to correctly map between different codesets. If both endpoints use bindings that support internationalization (i18n), Artix uses codeset conversion. If only one of the endpoints supports internationalization, the Artix endpoint supporting internationalization attempts to use codeset conversion on the messages.

The following bindings do not support internationalization:

- Tagged
- G2++
- XML

Routing between internationalized endpoints

When Artix is routing between internationalized endpoints, the receiving endpoint and the sending endpoint both behave independently of each other.

For example, if one endpoint of a router receives a request in Shift_JIS and the router is configured to use ISO-8859-1, the Shift_JIS request is properly decoded by the router.

However, when the request is passed on by the router, it is passed on in ISO-8859-1. If the two codesets are not compatible, there is a good chance that data will be lost in the conversion and the request will not be properly handled.

Note: If the codesets are not compatible, and data is lost in the router, Artix does not generate a warning.

Routing from non-internationalized to internationalized bindings

When Artix is routing from a non-internationalized endpoint to an internationalized endpoint, it uses the default codeset specified in the router's configuration for writing messages to internationalized endpoints. If the Artix router is configured to encode messages using a codeset that is different from the one used by the endpoint, you will lose data.

For example, if a Tibco application makes a request on a Web service through a router, the router receives non-internationalized data from the Tibco application. And the router then writes the SOAP message using the codeset specified in its configuration. If the Web service and the router are both configured to write in us-dk, the operation proceeds without a problem. The router receives the encoded response from the server and passes it back to the Tibco binding.

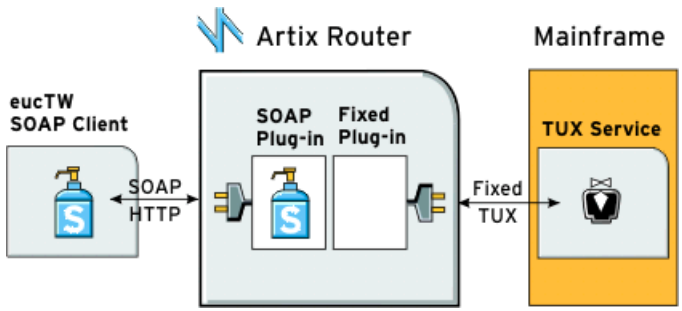
However, if the Web service is configured to accept data using us-dk, and the router is configured to encode data using Chinese, data may be lost between the router and the Web service due to codeset incompatibility.

Routing from internationalized to non-internationalized bindings

When Artix is routing SOAP messages to a non-SOAP endpoint, such as a Tuxedo server on a mainframe using the fixed plug-in, Artix handles the message transformations so that the SOAP application receives responses in the correct codeset.

For example, a Web service client in a Chinese locale encodes its requests in eucTW and invokes on a service that is hosted on a mainframe that is behind an Artix router, as shown in Figure 1.

Figure 1: *Routing Internationalized Requests*



The Artix router would process the request as follows:

1. On receiving the SOAP request, the router inspects the XML prologue and decodes the message using the specified codeset (in this case, eucTW).
2. The fixed binding plug-in then writes out the message to the mainframe service.
3. When the mainframe sends its response back to the router, the fixed binding decodes the message and passes it back to the SOAP plug-in.
4. The SOAP plug-in inspects the message and determines the request to that corresponds it.
5. The SOAP plug-in then encodes the message using the codeset specified in the request (in this case, eucTW), and passes the response to the client.

Part II

Configuration Reference

In this part

This part contains the following chapters:

CHAPTER 5

Artix Runtime Configuration

Artix is based on IONA's highly configurable Adaptive Runtime (ART) infrastructure. This provides a high-speed, robust, and scalable backbone for deploying integration solutions. This chapter explains the configuration settings for the Artix runtime.

In this chapter

This chapter includes the following:

ORB Plug-ins

Overview

The `orb_plugins` variable specifies the list of plug-ins that Artix processes load during initialization. A *plug-in* is a class or code library that can be loaded into an Artix application at runtime. These plug-ins enable you to load network transports, payload format mappers, error logging streams, and other features on the fly.

The default `orb_plugins` entry includes the following:

```
orb_plugins = ["xmlfile_log_stream",
               "iiop_profile",
               "giop",
               "iiop"];
```

All other plug-ins that implement bindings and transports load transparently when the WSDL file is loaded into an application. These plug-ins do not need to be explicitly listed in `orb_plugins`. Artix determines what plug-ins are required from the content of the WSDL file.

However, plug-ins for other services (for example, for security, locator, session manager, routing, XSLT transformation, logging, and so on) must all be included in the `orb_plugins` entry.

Artix plug-ins

Each network transport and payload format that Artix interoperates with uses its own plug-in. Many of the Artix services features also use plug-ins. Artix plug-ins include the following:

- "Java plug-ins".
- "Transport plug-ins".
- "Payload format plug-ins".
- "Service plug-ins".

Java plug-ins

Plug-ins written in Java are configured differently from C++ plug-ins. For the most part, only custom plug-ins are written in Java. However, the JMS transport plug-in is also written in Java and requires that you configure it appropriately.

Java plug-in loader

When using a Java plug-in, you must include an entry for the Java plug-in loader in the `orb_plugins` list, as shown in Example 13.

Example 13: *Including the Java Plug-in Loader*

```
orb_plugins=[..., "java", ...];
```

java_plugins variable

In addition to including the `java` plug-in loader in the `orb_plugin` list, you must specify the `java_plugins` configuration variable, which lists the names of the Java plug-ins that are to be loaded. `java_plugins` is a list like `orb_plugins`. A plug-in cannot be listed in both variables. Only Java plug-ins should be listed in `java_plugins` and the Java plug-ins should not be listed in `orb_plugins`.

For example, if you are using a Java plug-in called `java_handler` in your application you would use the configuration similar to the fragment shown in Example 14 to load the plug-ins.

Example 14: *Loading a Java Plug-in*

```
orb_plugins=["xml_log_stream", "java"];
java_plugins=["java_handler"];
```

Java plug-ins that are supplied by Artix, and which can be included in your `java_plugins` list include the following:

`java_uddi_proxy`	Dynamically locates existing Web services endpoints using the UDDI service.

Transport plug-ins

The Artix transport plug-ins are listed in Table 7.

Table 7: *Artix Transport Plug-ins*

Plug-in	Transport
`at_http`	Provides support for HTTP.
`https`	Provides support for HTTPS.
`iiop`	Provides support for CORBA IIOP.
`iiop_profile`	Provides support for CORBA IIOP profile.
`giop`	Provides support for CORBA GIOP.
`tunnel`	Provides support for the IIOP transport using non-CORBA payloads.
`tuxedo`	Provides support for Tuxedo interoperability.
`mq`	Provides support for IBM WebSphere MQ interoperability, and MQ transactions.
`tibrv`	Provides support for TIBCO Rendezvous interoperability.
`java`	Provides support for Java Message Service (JMS) interoperability (and also for Java UDDI and custom Java plug-ins).

Payload format plug-ins

The Artix payload format plug-ins are listed in Table 8.

Table 8: *Artix Payload Format Plug-ins*

Plug-in	Payload Format
`soap`	Decodes and encodes messages using the SOAP format.

Table 8: *Artix Payload Format Plug-ins (Continued)*

Plug-in	Payload Format
G2	Decodes and encodes messages packaged using the G2++ format.
fml	Decodes and encodes messages packaged in FML format.
tagged	Decodes and encodes messages packed in variable record length messages or another self-describing message format.
tibrv	Decodes and encodes TIBCO Rendezvous messages.
fixed	Decodes and encodes fixed record length messages.
ws_orb	Decodes and encodes CORBA messages.

Service plug-ins

The Artix service feature plug-ins are listed in Table 9.

Table 9: *Artix Service Plug-ins*

Plug-in	Artix Feature
bus_loader	In a pure CORBA application, add a bus_loader at the end of your plug-in list to start the bus and initialize all BusPlugins. Not needed if your application uses IT_Bus::init.
bus_response_monitor	Enables performance logging. Monitors response times of Artix client/server requests.
locator_endpoint	Enables endpoints to use the Artix locator service.
ots	Enables the CORBA OTS transaction system.

Table 9: *Artix Service Plug-ins (Continued)*

Plug-in	Artix Feature
`ots_lite`	Enables the OTS Lite transaction system, which supports one-phase commit transactions.
`request_forwarder`	Enables forwarding of write requests from slave replicas to master replicas.
`routing`	Enables Artix routing.
`service_locator`	Enables the Artix locator. An Artix server acting as the locator service must load this plug-in.
`session_manager_service`	Enables the Artix session manager. An Artix server acting as the session manager must load this plug-in.
`session_endpoint_manager`	Enables the Artix session manager. Endpoints wishing to be managed by the session manager must load this plug-in.
`sm_simple_policy`	Enables the policy mechanism for the Artix session manager. Endpoints wishing to be managed by the session manager must load this plug-in.
`service_lifecycle`	Enables service lifecycle for the Artix router. This optimizes performance of the router by cleaning up proxies/routes that are no longer in use.
`uddi_proxy`	Dynamically locates existing Web services endpoints using the UDDI service. See also "java_plugins variable" on page 71.
`wsat_protocol`	Enables the WS-Atomic Transaction (WS-AT) system.
`ws_chain`	Enables you to link together a series of services into a multi-part process.

Table 9: *Artix Service Plug-ins (Continued)*

Plug-in	Artix Feature
`ws_coordination_service`	Enables the WS-Coordination service, which coordinates two-phase commit transactions.
`wsdl_publish`	Enables Artix endpoints to publish and use Artix object references.
`wscolloc`	Enables colocation for applications that share a common binding. For example, using the Artix transformer with an Artix server, you can colocate both processes. Instead of passing messages through the messaging stack, messages are passed directly between the two, improving performance.
`xmlfile_log_stream`	Enables you to view Artix logging output in a file.
`xslt`	Enables Artix to process XSLT scripts.

Policies

Overview

The policies namespace contains variables that control the publishing of server and client hostnames. These include the following:

- policies:http:client_address_mode_policy:local_hostname
- policies:at_http:server_address_mode_policy:publish_hostname
- policies:at_http:server_address_mode_policy:local_hostname
- policies:http:server_address_mode_policy:port_range
- policies:iiop:server_address_mode_policy:publish_hostname
- policies:iiop:server_address_mode_policy:local_hostname
- policies:iiop:server_address_mode_policy:port_range
- policies:soap:server_address_mode_policy:publish_hostname
- policies:soap:server_address_mode_policy:local_hostname

policies:http:client_address_mode_policy:local_hostname

policies:http:client_address_mode_policy:local_hostname specifies the outgoing client hostname. This enables you to explicitly specify the hostname that the client binds on, when initiating a TCP connection.

This provides support for *multi-homed* client host machines with multiple hostnames or IP addresses (for example, those using multiple DNS aliases or multiple network interface cards).

For example, if you have a client machine with two network addresses (207.45.52.34 and 207.45.52.35), you can explicitly set this variable to either address:

```
policies:http:client_address_mode_policy:local_hostname =
    "207.45.52.34";
```

This variable accepts any valid string value. By default, the local_hostname variable is unspecified, and the client uses the 0.0.0.0 wildcard address. In this case, the network interface card used is determined by the operating system.

policies:at_http:server_address_mode_policy:publish_hostname

`policies:at_http:server_address_mode_policy:publish_hostname` specifies how the server's address is published in dynamically generated Artix contracts. For example:

```
policies:at_http:server_address_mode_policy:publish_hostname="false";
```

When set this policy is set to `false`, the dynamically generated contract publishes the IP address of the running server in the `http:address` element describing the server's location. This is the default behavior.

When this policy is set to `true`, the hostname of the machine hosting the running server is published in the `http:address` element describing the server's location.

If you are using the `wsdl_publish` plug-in, the following values also apply:

`canonical`	Publishes the fully qualified hostname of the machine in the dynamic WSDL (for example `http://myhost.mydomain.com`).
`unqualified`	Publishes the unqualified local hostname of the machine in the dynamic WSDL. This does not include domain name with the hostname (for example, `http://myhost`).
`ipaddress`	Publishes the IP address associated with the machine in the dynamic WSDL (for example `http://10.1.2.3`).

policies:at_http:server_address_mode_policy:local_hostname

`policies:at_http:server_address_mode_policy:local_hostname` specifies the server hostname that is published in dynamically generated Artix contracts. For example:

```
policies:at_http:server_address_mode_policy:local_hostname="207.45.52.34";
```

This variable accepts any valid string value. The specified hostname is published in the `http:address` element, which describes the server's location. If no hostname is specified, `policies:at_http:server_address_mode_policy:publish_hostname` is used instead.

policies:http:server_address_mode_policy:port_range

`policies:http:server_address_mode_policy:port_range` specifies a range of HTTP ports in the following format: *`FromPort:ToPort`*

For example:

```
policies:http:server_address_mode_policy:port_range="4003:4008";
```

Note: The specified `port_range` has no effect when a fixed TCP port is specified for the SOAP address in the WSDL contract. The WSDL setting takes precedence over the configuration file setting.

policies:iiop:server_address_mode_policy:publish_hostname

`policies:iiop:server_address_mode-policy:publish_hostname` specifes whether IIOP exports hostnames or IP addresses in published profiles. Defaults to `false` (exports IP addresses, and does not export hostnames). To use hostnames in object references, set this variable to `true`, as in the following file-based configuration entry:

```
policies:iiop:server_address_mode_policy:publish_hostname=true
```

policies:iiop:server_address_mode_policy:local_hostname

`policies:iiop:server_address_mode_policy:local_hostname` enables you to explicitly specify the host name that the server listens on and publishes in its IORs.

For example, if you have a machine with two network addresses (`207.45.52.34` and `207.45.52.35`), you can explicitly set this variable to either address:

```
policies:iiop:server_address_mode_policy:local_hostname =
   "207.45.52.34";
```

By default, the `local_hostname` variable is unspecified.

policies:iiop:server_address_mode_policy:port_range

`policies:iiop:server_address_mode_policy:port_range` specifies the range of ports that a server uses when there is no well-known addressing policy specified for the port. Specified values take the format of *`FromPort`*`:`*`ToPort`*, for example:

```
policies:iiop:server_address_mode_policy:port_range="4003:4008"
```

policies:soap:server_address_mode_policy:publish_hostname

`policies:soap:server_address_mode_policy:publish_hostname` specifies how the server's address is published in dynamically generated Artix contracts. For example:

```
policies:soap:server_address_mode_policy:publish_hostname="false";
```

When set this policy is set to `false`, the dynamically generated contract publishes the IP address of the running server in the `soap:address` element describing the server's location. This is the default behavior.

When this policy is set to `true`, the hostname of the machine hosting the running server is published in the `soap:address` element describing the server's location.

If you are using the `wsdl_publish` plug-in, the following values also apply:

`canonical`	Publishes the fully qualified hostname of the machine in the dynamic WSDL (for example `http://myhost.mydomain.com`).
`unqualified`	Publishes the unqualified local hostname of the machine in the dynamic WSDL. This does not include domain name with the hostname (for example, `http://myhost`).
`ipaddress`	Publishes the IP address associated with the machine in the dynamic WSDL (for example `http://10.1.2.3`).

policies:soap:server_address_mode_policy:local_hostname

`policies:soap:server_address_mode_policy:local_hostname` specifies the server hostname that is published in dynamically generated Artix contracts. For example:

```
policies:soap:server_address_mode_policy:local_hostname="207.45.52.34";
```

This variable accepts any valid string value. The specified hostname is published in the `soap:address` element, which describes the server's location. If no hostname is specified, `policies:soap:server_address_mode_policy:publish_hostname` is used instead.

Binding Lists

Overview

When using Artix's CORBA functionality you need to configure how Artix binds itself to message interceptors. The Artix `binding` namespace contains variables that specify interceptor settings. An interceptor acts on a message as it flows from sender to receiver.

Computing concepts that fit the interceptor abstraction include transports, marshaling streams, transaction identifiers, encryption, session managers, message loggers, containers, and data transformers. Interceptors are based on the "chain of responsibility" design pattern. Artix creates and manages chains of interceptors between senders and receivers, and the interceptor metaphor is a means of creating a virtual connection between a sender and a receiver.

The `binding` namespace includes the following variables:

- `client_binding_list`
- `server_binding_list`

client_binding_list

Artix provides client request-level interceptors for OTS, GIOP, and POA collocation (where server and client are collocated in the same process). Artix also provides and message-level interceptors used in client-side bindings for IIOP, SHMIOP and GIOP.

The `binding:client_binding_list` specifies a list of potential client-side bindings. Each item is a string that describes one potential interceptor binding. The default value is:

```
binding:client_binding_list = ["OTS+POA_Coloc","POA_Coloc","OTS+GIOP+IIOP","GIOP+IIOP"];
```

Interceptor names are separated by a plus (+) character. Interceptors to the right are "closer to the wire" than those on the left. The syntax is as follows:

- Request-level interceptors, such as `GIOP`, must precede message-level interceptors, such as `IIOP`.
- `GIOP` or `POA_coloc` must be included as the last request-level interceptor.

- Message-level interceptors must follow the GIOP interceptor, which requires at least one message-level interceptor.
- The last message-level interceptor must be a message-level transport interceptor, such as IIOP or SHMIOP.

When a client-side binding is needed, the potential binding strings in the list are tried in order, until one successfully establishes a binding. Any binding string specifying an interceptor that is not loaded, or not initialized through the orb_plugins variable, is rejected.

For example, if the ots plug-in is not configured, bindings that contain the OTS request-level interceptor are rejected, leaving ["POA_Coloc", "GIOP+IIOP", "GIOP+SHMIOP"]. This specifies that POA collocations should be tried first; if that fails, (the server and client are not collocated), the GIOP request-level interceptor and the IIOP message-level interceptor should be used. If the ots plug-in is configured, bindings that contain the OTS request interceptor are preferred to those without it.

server_binding_list

binding:server_binding_list specifies interceptors included in request-level binding on the server side. The POA request-level interceptor is implicitly included in the binding.

The syntax is similar to client_binding_list. However, in contrast to the client_binding_list, the left-most interceptors in the server_binding_list are "closer to the wire", and no message-level interceptors can be included (for example, IIOP). For example:

```
binding:server_binding_list = ["OTS",""];
```

An empty string ("") is a valid server-side binding string. This specifies that no request-level interceptors are needed. A binding string is rejected if any named interceptor is not loaded and initialized.

The default server_binding_list is ["OTS", ""]. If the ots plug-in is not configured, the first potential binding is rejected, and the second potential binding ("") is used, with no explicit interceptors added.

Binding Lists for Custom Interceptors

Overview

The `binding:artix` namespace includes variables that configure Artix applications to use custom interceptors.

Artix interceptors are listed in the order that they are invoked on a message when it passes through a messaging chain. For example, if a server request interceptor list is specified as `"interceptor_1+interceptor_2"`, the message is passed into `interceptor_1` as it leaves the binding. When `interceptor_1` processes the message, it is passed into `interceptor_2` for more processing. `interceptor_2` then passes the message along to the application code.

The interceptor chain is specified as a single string, and each interceptor name must be separated by a + character (for example, `"interceptor_1+interceptor_2+interceptor_3"`).

The variables in the `binding:artix` namespace are as follows:

- `client_message_interceptor_list`
- `client_request_interceptor_list`
- `server_message_interceptor_list`
- `server_request_interceptor_list`

These settings apply to all services activated in a single Artix bus. See also "Configuring interceptor chains at service port level" on page 85.

client_message_interceptor_list

`binding:artix:client_message_interceptor_list` is a string that specifies an ordered list of message-level interceptors for a Java or C++ client application. Each interceptor is separated using a + character, for example:

```
binding:artix:client_message_interceptor_list =
 "interceptor_1+interceptor_2";
```

There is no default value.

client_request_interceptor_list

`binding:artix:client_request_interceptor_list` is a string that specifies an ordered list of request-level interceptors for a Java or C++ client application. Each interceptor is separated using a + character, for example:

```
binding:artix:client_request_interceptor_list =
 "interceptor_1+interceptor_2";
```

There is no default value.

server_message_interceptor_list

`binding:artix:server_message_interceptor_list` is a string that specifies an ordered list of message-level interceptors for a Java or C++ server application. Each interceptor is separated using a + character, for example:

```
binding:artix:server_message_interceptor_list =
 "interceptor_1+interceptor_2";
```

There is no default value.

server_request_interceptor_list

`binding:artix:server_request_interceptor_list` is a string that specifies an ordered list of request-level interceptors for a Java or C++ server application. Each interceptor is separated using a + character, for example:

```
binding:artix:server_request_interceptor_list =
 "interceptor_1+interceptor_2";
```

There is no default value.

Configuring interceptor chains at service port level

Each of the variables in the `binding:artix` namespace can also be specified at the level of a service port. This more fine-grained approach enables you to configure different interceptor chains for different endpoints in the same application. For example:

```
binding:artix:client_request_interceptor_list:ServiceQname:PortName=
   "interceptor_1+interceptor_2";

binding:artix:server_request_interceptor_list:ServiceQname:PortName=
   "interceptor_1+interceptor_2";

binding:artix:client_message_interceptor_list:ServiceQname:PortName=
   "interceptor_1+interceptor_2";

binding:artix:server_message_interceptor_list:ServiceQname:PortName=
   "interceptor_1+interceptor_2"";
```

The syntax of a *`ServiceQname`* is *`NamespaceURI`*`:`*`LocalPart`*. The following example shows a service defined as `FooService` with a target namespace of `http://www.myco.com/myservice`:

```
binding:artix:client_request_interceptor_list:http://www.myco.com/myservice:FooService:FooPort=
   "interceptor_1+interceptor_2";
```

Interceptor Factory Plug-in

Overview

An Artix plug-in that implements an interceptor is dynamically loaded when the interceptor name is specified in the binding list (see "Binding Lists for Custom Interceptors" on page 83).

You must either include the interceptor plug-in name in your `orb_plugins` list, or specify an interceptor factory plug-in.

interceptor_factory:*InterceptorFactoryName*:plugin

`interceptor_factory:`*`InterceptorFactoryName`*`:plugin` specifies the name of the plug-in used by a custom interceptor. The format of this variable is as follows:

```
interceptor_factory:InterceptorFactoryName:plugin="PluginName";
```

For example,

```
interceptor_factory:TestInterceptor:plugin= "test_interceptor";
```

You do not need to add such configuration for the interceptors that are implemented internally by the various Artix plug-ins (for example, `security`, `service_lifecycle`, and `artix_response_time_interceptor`). These are all hard coded already.

C++ applications

The following names are used in this syntax:

- The name of the interceptor factory: *`InterceptorFactoryName`*
- If the interceptor is implemented as a plug-in, the name of the plug-in: (*`PluginName`*)
- The name of the shared library that hosts the plug-in: *`SharedLibName`*

You must always specify the mapping between the plug-in name and the shared library name, using the following configuration syntax:

```
plugins:PluginName:shlib_name = "SharedLibName";
```

There are two ways in which a plug-in can be loaded:

- Specify the plug-in name in the ORB plug-ins list, for example:

```
orb_plugins = [ ..., "PluginName", ... ];
```

  Using this approach, the plug-in is loaded during ORB initialization.

- Configure a mapping between an interceptor factory name and the plug-in name as follows:

```
interceptor_factory:InterceptorFactoryName:plugin="PluginName";
```

  Using this approach, the plug-in is loaded when the interceptor list is parsed.

Java applications

For Java applications, the interceptor factory is called a `HandlerFactory`. This can be registered with the Artix bus in either of the following ways:

- Write a Java plug-in and register a handler factory inside the plug-in. For details, see Developing Artix Applications in Java.
- Register directly with the Artix bus in your server or client mainline code. If you use this approach, you do not need any additional plug-in configuration, just specify the interceptor factory names in the list.

  The `HandlerFactory` should be registered before registering the servant on the server side, and before creating the client proxy base on the client-side. The public API is:

```
bus.registerHandlerFactory(new MyHandlerFactory());
```

  For more details, see Developing Artix Applications in Java.

Event Log

Overview

The event_log namespace control logging levels in Artix. It contains the following variables:

- event_log:filters
- event_log:filters:bus:pre_filter

event_log:filters

The event_log:filters variable can be set to provide a wide range of logging levels. The default event_log:filters setting displays errors only:

```
event_log:filters = ["*=FATAL+ERROR"];
```

The following setting displays errors and warnings only:

```
event_log:filters = ["*=FATAL+ERROR+WARNING"];
```

Adding INFO_MED causes all of request/reply messages to be logged (for all transport buffers):

```
event_log:filters = ["*=FATAL+ERROR+WARNING+INFO_MED"];
```

The following setting displays typical trace statement output (without the raw transport buffers being printed):

```
event_log:filters = ["*=FATAL+ERROR+WARNING+INFO_HI"];
```

The following setting displays all logging:

```
event_log:filters = ["*=*"];
```

The default configuration settings enable logging of only serious errors and warnings. For more exhaustive output, select a different filter list at the default scope, or include a more expansive event_log:filters setting in your configuration scope.

event_log:filters:bus:pre_filter

event_log:filters:bus:pre_filter provides filtering of log messages that are sent to the EventLog before they are output to the LogStream. This enables you to minimize the time spent generating log messages that will be ignored. For example:

```
event_log:filters:bus:pre_filter = "WARN+ERROR+FATAL";

event_log:filters = ["IT_BUS=FATAL+ERROR", "IT_BUS.BINDING=*"];
```

In this example, only WARNING, ERROR and FATAL priority log messages are sent to the EventLog. This means that no processing time is wasted generating strings for INFO log messages. The EventLog then only sends FATAL and ERROR log messages to the LogStream for the IT_BUS subsystem.

Note: event_log:filters:bus:pre_filter defaults to * (all messages). You should set this variable to improve performance.

Thread Pool Control

Overview

Variables in the `thread_pool` namespace set policies related to thread control. Thread pools can be configured at several levels, where the more specific configuration settings take precedence over the less specific. They can be set globally for Artix instances in a configuration scope, or they can be set on a per-service basis.

To set the values globally, use the following syntax:

```
thread_pool:VariableName
```

To set the values on a per-service basis, specify the service name (and optionally the service URI) from the Artix contract. The syntax is as follows:

```
thread_pool:VariableName:ServiceURI:ServiceName
```

Threading variables

This namespace includes following variables:

- `thread_pool:initial_threads`
- `thread_pool:high_water_mark`
- `thread_pool:low_water_mark`
- `thread_pool:max_queue_size`
- `thread_pool:stack_size`

The following variable applies to work queues:

- `service:owns_workqueue`

thread_pool:initial_threads

`thread_pool:initial_threads` sets the number of initial threads in each port's thread pool. Defaults to 2.

This variable can be set at different levels in your configuration. The following is a global setting:

```
thread_pool:initial_threads = "3";
```

The following setting is at the service name level, which overrides the global setting:

```
thread_pool:initial_threads:SessionManager = "1";
```

The following setting is at the fully-qualified service name level:

```
thread_pool:initial_threads:http://my.tns1/:SessionManager= "1";
```

This overrides the service name level, and is useful when there is a naming clash with service names from two different namespaces.

---

thread_pool:high_water_mark

`thread_pool:high_water_mark` sets the maximum number of threads allowed in each service's thread pool. Defaults to `25`.

This variable can be set at different levels in your configuration. The following is a global setting:

```
thread_pool:high_water_mark = "10";
```

The following setting is at the service name level, which overrides the global setting:

```
thread_pool:high_water_mark:SessionManager = "10";
```

The following setting is at the fully-qualified service name level:

```
thread_pool:high_water_mark:http://my.tns1/:SessionManager= "10";
```

This overrides the service name level, and is useful when there is a naming clash with service names from two different namespaces.

thread_pool:low_water_mark

`thread_pool:low_water_mark` sets the minimum number of threads in each service's thread pool. Artix will terminate unused threads until only this number exists. Defaults to `5`.

This variable can be set at different levels in your configuration. The following is a global setting:

```
thread_pool:low_water_mark  = "5";
```

The following setting is at the service name level, which overrides the global setting:

```
thread_pool:low_water_mark:SessionManager = "5";
```

The following setting is at the fully-qualified service name level:

```
thread_pool:low_water_mark:http://my.tns1/:SessionManager= "5";
```

This overrides the service name level, and is useful when there is a naming clash with service names from two different namespaces.

thread_pool:max_queue_size

`thread_pool:max_queue_size` specifies the maximum number of request items that can be queued on the internal work queue. If this limit is exceeded, Artix considers the server to be overloaded, and gracefully closes down connections to reduce the load. Artix rejects subsequent requests until there is free space in the work queue.

Defaults to `-1`, which means that there is no upper limit on the size of the request queue. In this case, the maximum work queue size is limited by how much memory is available to the process.

The following is a global setting:

```
thread_pool:max_queue_size  = "10";
```

The following setting is at the service name level, which overrides the global setting:

```
thread_pool:max_queue_size:SessionManager = "10";
```

The following setting is at the fully-qualified service name level:

```
thread_pool:max_queue_size:http://my.tns1/:SessionManager= "10";
```

This overrides the service name level, and is useful when there is a naming clash with service names from two different namespaces.

---

thread_pool:stack_size

`thread_pool:stack_size` specifies the stack size for each thread. The stack size is specified in bytes. The default is the following global setting:

```
thread_pool:stack_size = 1048576;
```

The following setting is at the service name level, which overrides the global setting:

```
thread_pool:stack_size:SessionManager = "1048576";
```

The following setting is at the fully-qualified service name level:

```
thread_pool:stack_size:http://my.tns1/:SessionManager= "1048576";
```

This overrides the service name level, and is useful when there is a naming clash with service names from two different namespaces.

---

service:owns_workqueue

`service:owns_workqueue` specifies whether the service can own a workqueue. If this variable is set to `true`, the service can own a workqueue, if needed. For example, this means that if your application calls `Service::get_workqueue()`, this creates and returns a work queue specific to that service.

If this variable is set to is false, the service never owns a work queue. It uses the bus work queue. The default value is `true`.

Initial Contracts

Overview

Initial contracts specify the location of the WSDL contracts for Artix services. This provides a uniform mechanism for bootstrapping Artix services and contracts, and enables user code to be written in a location transparent way.

Because these variables are in the global scope of `artix.cfg`, every application can access the contracts. These contracts specify a `localhost:0` port, which means that the operating system assigns a TCP/IP port on startup.

To explicitly set a port, copy the relevant WSDL contract to another location, and edit it to include the port. In the application scope, add a `bus:initial_contract:url` entry that points to the edited WSDL file. The `bus:initial_contract:url` namespace includes the following variables:

- `container`
- `locator`
- `peermanager`
- `sessionmanager`
- `sessionendpointmanager`
- `uddi_inquire`
- `uddi_publish`
- `login_service`

container

`bus:initial_contract:url:container` specifies the location of the WSDL contract for the Artix container serivice. For example:

```
bus:initial_contract:url:container =
   "InstallDir/artix/Version/wsdl/container.wsdl";
```

locator

`bus:initial_contract:url:locator` specifies the location of the WSDL contract for the Artix locator serivice. For example:

```
bus:initial_contract:url:locator =
   "InstallDir/artix/Version/wsdl/locator.wsdl";
```

peermanager

`bus:initial_contract:url:peermanager` specifies the location of the WSDL contract for the Artix peer manager. For example:

```
bus:initial_contract:url:peermanager  =
   "InstallDir/artix/Version/wsdl/peer-manager.wsdl";
```

sessionmanager

`bus:initial_contract:url:sessionmanager` specifies the location of the WSDL contract for the Artix session manager. For example:

```
bus:initial_contract:url:sessionmanager  =
   "InstallDir/artix/Version/wsdl/session-manager.wsdl";
```

sessionendpointmanager

`bus:initial_contract:url:sessionendpointmanager` specifies the location of the WSDL contract for the Artix session endpoint manager. For example:

```
bus:initial_contract:url:sessionendpointmanager  =
   "InstallDir/artix/Version/wsdl/session-manager.wsdl";
```

uddi_inquire

`bus:initial_contract:url:uddi_inquire` specifies the location of the WSDL contract for the Artix UDDI inquire service. For example:

```
bus:initial_contract:url:uddi_inquire  =
   "InstallDir/artix/Version/wsdl/uddi/uddi_v2.wsdl";
```

uddi_publish

`bus:initial_contract:url:uddi_publish` specifies the location of the WSDL contract for the Artix UDDI publish service. For example:

```
bus:initial_contract:url:uddi_publish  =
   "InstallDir/artix/Version/wsdl/uddi/uddi_v2.wsdl";
```

login_service

`bus:initial_contract:url:login_service` specifies the location of the WSDL contract for the Artix peer manager. For example:

```
bus:initial_contract:url:login_service  =
   "InstallDir/artix/Version/wsdl/login_service.wsdl";
```

Further information

For more information on bootstrapping, see Deploying and Managing Artix Solutions.

Initial References

Overview

Initial references provide a uniform mechanism for bootstrapping servers and clients so that they can communicate with services deployed in the Artix container. This enables user code to be written in a location transparent way. The `bus:initial_references` namespace includes the following variables:

- `locator`
- `peermanager`
- `sessionmanager`
- `sessionendpointmanager`
- `uddi_inquire`
- `uddi_publish`
- `login_service`
- `container`

locator

`bus:initial_references:url:locator` specifies the location of an initial reference to the Artix locator service. For example:

```
bus:initial_references:url:locator = "./locator.ref";
```

For example, the `locator.ref` initial reference file can be generated using the following command:

```
it_container_admin -container ContainerService.url
   -publishreference -service
   {http://ws.iona.com/locator}LocatorService -file locator.ref
```

In this example, `it_container_admin` asks the Artix container service in `ContainerService.url` to publish a reference to a locator service. The same command can be used when a server or a client obtains a reference.

peermanager

`bus:initial_references:url:peermanager` specifies the location of an initial reference to the Artix peer manager service. For example:

```
bus:initial_references:url:peermanager = "./peermanager.ref";
```

For example, the `peermanager.ref` initial reference file can be generated using the following command:

```
it_container_admin -container ContainerService.url
   -publishreference -service
   {http://ws.iona.com/peer_manager}PeerManagerService -file
   peermanager.ref
```

In this example, `it_container_admin` asks the Artix container service in `ContainerService.url` to publish a reference to a peer manager service. The same command can be used when a server or a client obtains a reference.

sessionmanager

`bus:initial_references:url:sessionmanager` specifies the location of an initial reference to the Artix session manager service. For example:

```
bus:initial_references:url:sessionmanager =
   "./sessionmanager.ref";
```

For example, the `sessionmanager.ref` initial reference file can be generated using the following command:

```
it_container_admin -container ContainerService.url
   -publishreference -service
   {http://ws.iona.com/sessionmanager}SessionManagerService
   -file sessionmanager.ref
```

In this example, `it_container_admin` asks the Artix container service in `ContainerService.url` to publish a reference to a session manager service. The same command can be used when a server or a client obtains a reference.

sessionendpointmanager

`bus:initial_references:url:sessionendpointmanager` specifies the location of an initial reference to the Artix session endpoint manager service. For example:

```
bus:initial_references:url:sessionendpointmanager =
   "./sessionendpointmanager.ref";
```

For example, the `sessionendpointmanager.ref` initial reference file can be generated using the following command:

```
it_container_admin -container ContainerService.url
   -publishreference -service
   {http://ws.iona.com/sessionmanager}SessionEndpointManagerService
   -file sessionendpointmanager.ref
```

In this example, `it_container_admin` asks the Artix container service in `ContainerService.url` to publish a reference to a session endpoint manager service. The same command can be used when a server or a client obtains a reference.

uddi_inquire

`bus:initial_references:url:uddi_inquire` specifies the location of an initial reference to the Artix UDDI inquire service. For example:

```
bus:initial_references:url:uddi_inquire = "./uddi_inquire.ref";
```

For example, the `uddi_inquire.ref` initial reference file can be generated using the following command:

```
it_container_admin -container ContainerService.url
   -publishreference -service
   {http://www.iona.com/uddi_over_artix}UDDI_InquireService
   -file uddi_inquire.ref
```

In this example, `it_container_admin` asks the Artix container service in `ContainerService.url` to publish a reference to a UDDI inquire service. The same command can be used when a server or a client obtains a reference.

uddi_publish

bus:initial_references:url:uddi_publish specifies the location of an initial reference to the Artix UDDI publish service. For example:

```
bus:initial_references:url:uddi_publish = "./uddi_publish.ref";
```

For example, the uddi_publish.ref initial reference file can be generated using the following command:

```
it_container_admin -container ContainerService.url
   -publishreference -service
   {http://www.iona.com/uddi_over_artix}UDDI_PublishService
   -file uddi_publish.ref
```

In this example, it_container_admin asks the Artix container service in ContainerService.url to publish a reference to a UDDI publish service. The same command can be used when a server or a client obtains a reference.

login_service

bus:initial_references:url:login_service specifies the location of an initial reference to the Artix login service. For example:

```
bus:initial_references:url:login_service =
   "./login_service.ref";
```

For example, the login_service.ref initial reference file can be generated using the following command:

```
it_container_admin -container ContainerService.url
   -publishreference -service
   {http://ws.iona.com/login_service}LoginService -file
   locator.ref
```

In this example, it_container_admin asks the Artix container service in ContainerService.url to publish a reference to a login service. The same command can be used when a server or a client obtains a reference.

container

`bus:initial_references:url:container` specifies the location of an initial reference to the Artix container service. For example:

```
bus:initial_references:url:container = "./container.ref";
```

For example, the `container.ref` initial reference file can be generated using the following command:

```
it_container_admin -container ContainerService.url
   -publishreference -service
   {http://ws.iona.com/container}ContainerService -file
   container.ref
```

In this example, `it_container_admin` asks the Artix container service in `ContainerService.url` to publish a reference to a container service. The same command can be used when a server or a client obtains a reference.

Further information

For more information on bootstrapping, see Deploying and Managing Artix Solutions.

QName Aliases

Overview

QName aliases are shorthand names for services in Artix configuration files. QNames are specified in the following format:

{NamespaceURI}LocalPart

For example: `{http://ws.iona.com/locator}LocatorService`. In this case, the `bus:initial_references:url:locator` variable is used as a shorthand instead of a more verbose format, such as `bus:initial_references:url:LocatorService:http://ws.iona.com/locator`.

The `bus:qname_alias` namespace includes the following variables:

- `container`
- `locator`
- `peermanager`
- `sessionmanager`
- `sessionendpointmanager`
- `uddi_inquire`
- `uddi_publish`
- `login_service`

container

`bus:qname_alias:container` specifies the QName alias for the Artix container service. For example:

```
bus:qname_alias:container =
"{http://ws.iona.com/container}ContainerService";
```

locator

`bus:qname_alias:locator` specifies the QName alias for the Artix locator service. For example:

```
bus:qname_alias:locator =
   "{http://ws.iona.com/locator}LocatorService";
```

peermanager

`bus:qname_alias:peermanager` specifies the QName alias for the Artix peer manager service. For example:

```
bus:qname_alias:peermanager =
   "{http://ws.iona.com/peer_manager}PeerManagerService";
```

sessionmanager

`bus:qname_alias:sessionmanager` specifies the QName alias for the Artix session manager service. For example:

```
bus:qname_alias:sessionmanager =
   "{http://ws.iona.com/sessionmanager}SessionManagerService";
```

sessionendpointmanager

`bus:qname_alias:sessionendpointmanager` specifies the QName alias for the Artix session endpoint manager service. For example:

```
bus:qname_alias:sessionendpointmanager =
   "{http://ws.iona.com/sessionmanager}SessionEndpointManagerService";
```

uddi_inquire

bus:qname_alias:uddi_inquire specifies the QName alias for the Artix UDDI inquire service. For example:

```
bus:qname_alias:uddi_inquire =
   "{http://www.iona.com/uddi_over_artix}UDDI_InquireService";
```

uddi_publish

bus:qname_alias:uddi_publish specifies the QName alias for the Artix UDDI publish service. For example:

```
bus:qname_alias:uddi_publish =
   "{http://www.iona.com/uddi_over_artix}UDDI_PublishService";
```

login_service

bus:qname_alias:login_service specifies the QName alias for the Artix login service. For example:

```
bus:qname_alias:login_service =
   "{http://ws.iona.com/login_service}LoginService";
```

Further information

For more information on bootstrapping, see Deploying and Managing Artix Solutions.

Reference Compatibility

Overview

In Artix 3.0.1, the references produced by Artix no longer use a hard coded `reference_properties` element name. Instead, references use extension element names that are described in the port definition.

Artix 3.0.1 reference format

For example, when using SOAP, an Artix 3.0.1 stringified reference has the following format:

```
<?xml version='1.0' encoding='utf-8'?>
<m1:reference service="m2:AccountService"
                        wsdlLocation="file:./bank.wsdl"
                        xmlns:xs="http://www.w3.org/2001/XMLSchema"
                        xmlns:m1="http://www.iona.com/bus"
                        xmlns:m2="http://www.iona.com/bus/tests"

   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <port name="AccountPort" binding="m2:AccountBinding">
        <m3:address xsi:type="m3:tAddress"

   location="http://localhost:999/AccountService/AccountPort/"
            xmlns:m3="http://schemas.xmlsoap.org/wsdl/soap/">
        </m3:address>
    </port>
</m1:reference>
```

Pre-Artix 3.0.1 reference format

In earlier versions, stringified references had the following format:

```
<?xml version='1.0' encoding='utf-8'?>
<m1:reference service="m2:AccountService"
                       wsdlLocation="file:./bank.wsdl"
                       xmlns:xs="http://www.w3.org/2001/XMLSchema"
                       xmlns:m1="http://www.iona.com/bus"
                       xmlns:m2="http://www.iona.com/bus/tests"
                      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

    <port name="AccountPort" binding="m2:AccountBinding">
        <reference_properties xsi:type="m3:tAddress"
            location="http://localhost:999/AccountService/AccountPort/"
            xmlns:m3="http://schemas.xmlsoap.org/wsdl/soap/">
        </reference_properties>
    </port>
</m1:reference>
```

Note: This change is wire incompatible with previous versions of Artix.

bus:reference_2.1_compat

`bus:reference_2.1_compat` specifies backward compatability with pre-Artix 3.0.1 versions of a reference. For example:

```
bus:reference_2.1_compat = "true";
```

If this variable is set to `true`, the reference is generated in the pre-Artix 3.0.1 format. If this is not set or set to `false`, references are generated in the Artix 3.0.1 format.

CHAPTER 6

Artix Plug-in Configuration

Artix is built on IONA's Adaptive Runtime architecture (ART), which enables users to configure services as plugins to the core product. This chapter explains the configuration settings for Artix-specific plug-ins.

Overview

Each Artix transport, payload format, and service has properties that are configurable as plug-ins to the Artix runtime. The variables used to configure plug-in behavior are specified in the configuration scopes of each Artix runtime instance, and follow the same order of precedence. A plug-in setting specified in the global configuration scope is overridden by a value set in a narrower scope.

For example, if you set `plugins:routing:use_pass_through` to `true` in the global scope, and set it to `false` in the `my_app` scope, all Artix runtimes, except for those running in the `my_app` scope, use `true` for this value. Any Artix instance using the `my_app` scope uses `false` for this value.

In this chapter

This chapter includes the following:

Bus

Overview

The plugins:bus namespace includes the following variables:

- plugins:bus:register_client_context
- plugins:bus:default_tx_provider:plugin

plugins:bus:register_client_context

plugins:bus:register_client_context specifies whether to register a client context. You can enable registration of client contexts as follows:

```
plugins:bus:register_client_context = "true";
```

The client context provides information about the origin of the incoming request (for example, its original IP address). By default, the context is not registered. This avoids any extra overhead associated with obtaining this information and populating the context.

plugins:bus:default_tx_provider:plugin

plugins:bus:default_tx_provider:plugin specifies the default transaction system used by Artix when a new transaction is started by bus.transactions().begin_transaction(). The specified value is the plug-in name of the transaction system provider plug-in. The available values are:

ots_tx_provider	Uses OTS as the transaction provider. Creates either an OTS Lite (single-resource) or OTS Encina (multi-resource) transaction. This is the default setting. For details of the additional configuration used to specify whether OTS Lite or OTS Encina is used, see Chapter 8.
wsat_tx_provider	Uses a WS-Coordination/WS-AtomicTransaction provider. The coordination service can either be run in-process or inside the Artix container.

Selecting a transaction provider

The choice of which transaction provider to use depends on the type of Artix binding your application uses. If most of your communication is over a CORBA binding, use `ots_tx_provider`. If most of your communication uses a SOAP binding, use `wsat_tx_provider`.

In both cases, Artix automatically interposes a transaction context of the correct type when a call is made over a particular binding. For example, if the default provider is OTS, and the application makes an outbound SOAP call, Artix includes a WS-AtomicTransaction SOAP header in the SOAP call. In this case, the transaction is still coordinated by OTS.

Similarly, if the default provider is WSAT, and a CORBA call is made, Artix automatically includes an OTS CORBA service context in the IIOP call. In this case, the transaction is coordinated by a WS-Coordination service.

orb_plugin configuration

The appropriate plug-in for your transaction system must also be loaded. For example, to load the OTS plug-in, include the `ots` plug-in name in the `orb_plugins` list:

```
# Artix Configuration File
ots_lite_client_or_server {
    plugins:bus:default_tx_provider:plugin = "ots_tx_provider";
    orb_plugins = [ ..., "ots"];
};
```

For full details of using transaction systems in Artix, see Developing Artix Applications with C++.

CA WSDM Observer

Overview

The `plugins:ca_wsdm_observer` namespace includes the following variables:

- `plugins:ca_wsdm_observer:auto_register`
- `plugins:ca_wsdm_observer:config_poll_time`
- `plugins:ca_wsdm_observer:handler_type`
- `plugins:ca_wsdm_observer:max_queue_size`
- `plugins:ca_wsdm_observer:min_queue_size`
- `plugins:ca_wsdm_observer:report_wait_time`

plugins:ca_wsdm_observer:auto_register

`plugins:ca_wsdm_observer:auto_register` specifies whether the Artix CA WSDM observer automatically registers observed services with a WSDM service. The default is:

```
plugins:ca_wsdm_observer:auto_register = "true";
```

If you have a large number of observed services, the runtime performance may be decreased because of equally large register service requests sent to a WSDM service.

You can set this variable to `false` and manually import service details from WSDL definitions into a WSDM console. However, this only works for SOAP-HTTP non-transient services. This is because WSDM can not import non-SOAP services described in WSDL, while Artix does not publish WSDL for transient services.

plugins:ca_wsdm_observer:config_poll_time

`plugins:ca_wsdm_observer:config_poll_time` specifies how often, in seconds, the observer should poll a WSDM service for configuration updates, use the following variable:

```
plugins:ca_wsdm_observer:config_poll_time
```

The default is `180` seconds (3 minutes). Configuration updates tell the observer whether transaction monitors have been enabled. If so, the observer copies input/output raw messages, and reports them to a WSDM service if duration or request/response size thresholds have been exceeded.

plugins:ca_wsdm_observer:handler_type

`plugins:ca_wsdm_observer:handler_type` specifies a value that identifies an Artix observer to a WSDM service. It should be above `200`. The default is:

```
plugins:ca_wsdm_observer:handler_type = "217";
```

In addition, if you change the default, you must also update the following file with the new handler type:

```
WSDM-Install-Dir/server/default/conf/WsdmSOMMA_Basic.properties
```

Entries in this file take a format of `observertype.X=ArtixObserver`, where `X` is the handler type value. The default entry is:

```
observertype.217=ArtixObserver
```

plugins:ca_wsdm_observer:max_queue_size

plugins:ca_wsdm_observer:max_queue_size specifies the maximum number of service request records that the observer queue can hold. For example:

```
plugins:ca_wsdm_observer:max_queue_size = "600";
```

The default is 500. New records are dropped when the queue size reaches this value. If report_wait_time is not set, this variable is ignored. In this case, reports are sent as soon as the queue size is equal to max_queue_size.

plugins:ca_wsdm_observer:min_queue_size

plugins:ca_wsdm_observer:min_queue_size specifies how many service request records must be available in a queue before a report is sent to a WSDM service. For example:

```
plugins:ca_wsdm_observer:min_queue_size = "6";
```

The default is 5. Set this variable if your load is expected to be large. If this variable is too low, the observer may send reports too frequently, and if it is too high, the memory footprint may increase significantly.

plugins:ca_wsdm_observer:report_wait_time

plugins:ca_wsdm_observer:report_wait_time specifies how often reports should be sent in seconds. For example:

```
plugins:ca_wsdm_observer:report_wait_time = 10;
```

This variable is an alternative to min_queue_size, which instead specifies the frequency of reports on a time basis. This variable should be used with max_queue_size.

Container

Overview

The `plugins:container` namespace includes the following variables:

- `plugins:container:deployfolder`
- `plugins:container:deployfolder:readonly`

plugins:container:deployfolder

`plugins:container:deployfolder` specifies the location of a local folder where deployment descriptor files are saved to, and where they are read from on restart. For example:

```
plugins:container:deployfolder="../etc";
```

At startup, the container looks in the configured deployment folder and deploys the contents of the folder.

By default, this folder enabled for dynamic read/write deployment. This means that the container adds and removes files from the deployment folder dynamically as services are deployed or removed from the container.

plugins:container:deployfolder:readonly

`plugins:container:deployfolder:readonly` specifies whether the local folder used to store deployment descriptor file is a read-only folder. This can be used as an initialization folder to predeploy the same required set of services after every restart.

This variable should be used in conjunction with `plugins:container:deployfolder`. For example, the following configuration enables a read-only persistent deployment folder:

```
plugins:container:deployfolder:readonly="true";
```

Database Environment

Overview

The variables in the `plugins:artix:db` namespace configure database environment and service replication settings:

- `plugins:artix:db:db_open_retry_attempts`
- `plugins:artix:db:election_timeout`
- `plugins:artix:db:env_name`
- `plugins:artix:db:home`
- `plugins:artix:db:iiop:port`
- `plugins:artix:db:inter_db_open_sleep_period`
- `plugins:artix:db:max_ping_retries`
- `plugins:artix:db:ping_lifetime`
- `plugins:artix:db:ping_retry_interval`
- `plugins:artix:db:priority`
- `plugins:artix:db:replica_name`
- `plugins:artix:db:replicas`
- `plugins:artix:db:roundtrip_timeout`
- `plugins:artix:db:sync_retry_attempts`

plugins:artix:db:db_open_retry_attempts

`plugins:artix:db:db_open_retry_attempts` specifies the number of attempts made by a slave to open its new database.

When a slave starts for the first time and synchronizes with an existing master, it may take some time for a slave to receive the master's database over the wire, especially if the database is large. If the slave gets `no such file or directory` errors when starting up, it may help to increase this value. Defaults to `5`.

plugins:artix:db:election_timeout

`plugins:artix:db:election_timeout` specifies the time spent attempting to elect a new master. If a master can not be found in this time, a new election is started. Defaults to `2000` milliseconds (2 seconds). You should not often need to change this setting.

plugins:artix:db:env_name

`plugins:artix:db:env_name` specifies the filename for the Berkeley DB environment file. The value specified must be the same for all replicas. Defaults to `db_env`.

For example:

```
plugins:artix:db:env_name = “myDB_env”;
```

plugins:artix:db:home

`plugins:artix:db:home` specifies the directory where Berkeley DB stores all the files for the service databases. Each service should have a dedicated folder for its data stores. This is especially important for replicated services. Defaults to `"."` (the current working directory). It is recommended that you set this variable to a specific directory.

For example:

```
plugins:artix:db:home = “/etc/dbs/persisting_service”;
```

plugins:artix:db:iiop:port

`plugins:artix:db:iiop:port` specifies the IIOP port that the replica service starts on, and is used for communications between replicas. Defaults to `0`.

This variable must be set in a subscope for each replica specified in the `plugins:artix:db:replicas` list. The following example shows a subscope for the `rep1` replica:

```
rep1{
    plugins:artix:db:replica_name = “rep1”;
    plugins:artix:db:priority = 80;
    plugins:artix:db:iiop:port = 2000;
  };
```

plugins:artix:db:inter_db_open_sleep_period

`plugins:artix:db:inter_db_open_sleep_period` specifies the amount of time spent sleeping between failed database open attempts on the slave side. This variable is related to `plugins:artix:db:db_open_retry_attempts`.

Defaults to `2000` milliseconds (`2` seconds).

plugins:artix:db:max_ping_retries

`plugins:artix:db:max_ping_retries` specifies how many failed pings between replicas can happen before the remote replica is considered unreachable. The replica is then marked as unavailable until it can be pinged again.

Defaults to `1`. This means that if one ping fails, the replica is marked as `UNAVAIL`, and no attempt is made to send it any database update or election packets until it becomes available again.

For more details, see `plugins:artix:db:ping_lifetime`.

plugins:artix:db:ping_lifetime

`plugins:artix:db:ping_lifetime` specifies the amount of time that the servant pinging replicas waits for before returning. Defaults to `10000` milliseconds (`10` seconds).

Replicas monitor each other using inter-replica pings. These pings are optimized to minimize the amount of network traffic between replicas. This optimization is based on specifying long-lived pings.

If the server process dies before returning, the caller gets an immediate notification of the failure of the ping. However, if the server machine dies, the notification occurs when `plugins:artix:db:roundtrip_timeout` expires. This is because the server-side TCP/IP stack can not notify the caller of connection failure if the host machine dies unexpectedly.

plugins:artix:db:ping_retry_interval

`plugins:artix:db:ping_retry_interval` specifies the number of milliseconds between inter-replica ping attempts. Defaults to `2000` milliseconds (`2` seconds).

For more details, see `plugins:artix:db:ping_lifetime`.

plugins:artix:db:priority

`plugins:artix:db:priority` specifies the replica priority. The higher the priority the more likely the replica is to be elected as master. This variable should be set if you are using replication.

There is no guarantee that the replica with the highest priority is elected master. The first consideration for electing a master is who has the most current database. Setting a priority of `0` means that the replica is never elected master. Defaults to `1`.

This variable must be set in a subscope for each replica. See the example for `plugins:artix:db:iiop:port`.

plugins:artix:db:replica_name

plugins:artix:db:replica_name specifies a simple string name for the replica. It indicates the replica in the plugins:artix:db:replicas list that this configuration refers to.

This variable must be set if plugins:artix:db:replicas is set, otherwise a DBException/BAD_CONFIGURATION is thrown. Each replica must have its own unique name, and must be present in the list.

This variable must be set in a subscope for each replica. See the example for plugins:artix:db:iiop:port.

plugins:artix:db:replicas

plugins:artix:db:replicas specifies a cluster of replica services. This variable takes a list of replicas specified using the following syntax:

ReplicaName=HostName:PortNum

For example, the following entry configures a cluster of three replicas spread across three machines named jimi, noel, and mitch.

```
plugins:artix:db:replicas=[“rep1=jimi:2000”, “rep2=mitch:3000”,
“rep3=noel:4000”];
```

Defaults to an empty list.

plugins:artix:db:roundtrip_timeout

plugins:artix:db:roundtrip_timeout specifies the amount of time that a replica waits for a response from a ping sent to another replica. Defaults to 20000 milliseconds (20 seconds).

If this variable is not set, some failed pings may take a long time to return (for example, if the target machine loses power). When a machine fails, the TCP/IP stack on the machine can not terminate the connection. The client still waits for a reply, and thinks that the connection is still valid.

The client only sees that the connection dies when TCP/IP times out and marks the connection as terminated. The variable prevents this situation from occurring.

Note: This variable must be set to a larger value than `plugins:artix:db:ping_lifetime`. Otherwise, valid pings would be regarded as having timed out when they are still in progress.

plugins:artix:db:sync_retry_attempts

`plugins:artix:db:sync_retry_attempts` specifies the maximum number of times that the slave sends a synchronization request to the master. This is used when a slave starts for the first time and synchronizes with an existing master.

Slave synchronization is performed by the slave sending a request to the master to write a small piece of data to its database, and then the slave waiting for this data to appear. When the data appears on the slave side, the slave knows it is processing live records from the master and is up-to-date and synchronized. Defaults to 5. You should rarely need to change this setting.

Java Message Service

Overview

The variables in the `plugins:jms` namespace configure settings for interoperability with the Java Message Service. These include the following:

- `plugins:jms:policies:binding_establishment:backoff_ratio`
- `plugins:jms:policies:binding_establishment:initial_iteration_delay`
- `plugins:jms:policies:binding_establishment:backoff_ratio`

plugins:jms:policies:binding_establishment:backoff_ratio

`plugins:jms:policies:binding_establishment:backoff_ratio` specifies the degree to which delays between reconnection retries increase from one retry to the next. This is used when Artix tries to reconnect to the Java Message Service after a connection is dropped (for example, if JMS becomes unavailable, or a network error occurs).

The successive delays between retries use the following geometric progression:

Retry Number	Delay
1	`initial_iteration_delay` x `backoff_ratio` ^{0}
2	`initial_iteration_delay` x `backoff_ratio` ^{1}
n	`initial_iteration_delay` x `backoff_ratio` $^{(n-1)}$

For example, if the `initial_iteration_delay` is `1000` milliseconds, and the `backoff_ratio` is `2`:

- The first retry waits 1000 milliseconds.
- The second retry waits 1000 x 2 milliseconds.
- The third retry waits 1000 x 2 x 2 milliseconds.
- ....
- The nth retry waits 1000 x 2 ^ (n-1).

The data type is `long`, and values must be greater than or equal to `0`. Defaults to `2`:

```
plugins:jms:policies:binding_establishment:backoff_ratio="2";
```

In your code, in the event of an initial failure, or an inability to make a connection after the configured retries have been exhausted, a method call will receive a `RemoteException`, which wraps a `TransportException`.

plugins:jms:policies:binding_establishment:initial_iteration_delay

`plugins:jms:policies:binding_establishment:initial_iteration_delay` specifies the amount of time, between the first and second attempts to establish a connection with a JMS broker.

The data type is `long`, and values must be greater than or equal to `0`. Defaults to `1000` milliseconds:

```
plugins:jms:policies:binding_establishment:initial_iteration_delay="1000";
```

plugins:jms:policies:binding_establishment:max_binding_iterations

`plugins:jms:policies:binding_establishment:max_binding_iterations` specifies the limit on the number of times that an Artix client tries to reconnect to a JMS broker. To disable reconnecting to the Java Message Service, set this variable to `0`.

The data type is `long`, and values must be greater than or equal to `0`. Defaults to `5`:

```
plugins:jms:policies:binding_establishment:max_binding_iterations="5";
```

Local Log Stream

Overview

The variables in the `plugins:local_log_stream` namespace configure text-based logging. By default, Artix is configured to log messages in an XML format. You can change this behavior using the `local_log_stream` plugin.

The `plugins:local_log_stream` namespace contains the following variables:

- `plugins:local_log_stream:buffer_file`
- `plugins:local_log_stream:filename`
- `plugins:local_log_stream:log_elements`
- `plugins:local_log_stream:log_thread_id`
- `plugins:local_log_stream:milliseconds_to_log`
- `plugins:local_log_stream:log_elements`

plugins:local_log_stream:buffer_file

`plugins:local_log_stream:buffer_file` specifies whether the output stream is sent to a buffer before it writes to a local log file. To specify this behavior, set this variable to `true`:

```
plugins:local_log_stream:buffer_file = "true";
```

When set to `true`, by default, the buffer is output to a file every 1000 milliseconds when there are more than 100 messages logged. This log interval and number of log elements can also be configured.

plugins:local_log_stream:filename

`plugins:local_log_stream:filename` sets the output stream to the specified local text file. For example:

```
plugins:local_log_stream:filename = "/var/adm/mylocal.log";
```

If you do not specify a file name, logging is sent to `stdout`.

plugins:local_log_stream:log_elements

`plugins:local_log_stream:log_elements` specifies the number of log messages that must be in the buffer before they are output to a log file. The default is 100 messages.

For example, the following configuration writes the log output to a log file if there are more than 20 log messages in the buffer.

```
plugins:local_log_stream:log_elements = "20";
```

plugins:local_log_stream:log_thread_id

`plugins:local_log_stream:log_thread_id` specifies whether the thread ID is logged in the log message or not, for example:

```
plugins:local_log_stream:log_thread_id = "true";
```

The default is `true`.

plugins:local_log_stream:milliseconds_to_log

`plugins:local_log_stream:milliseconds_to_log` specifies how often in milliseconds that the log buffer is output to a log file. The default is 1000 milliseconds.

For example, the following configuration writes the log output to a log file every 400 milliseconds.

```
plugins:local_log_stream:milliseconds_to_log = "400";
```

plugins:local_log_stream:rolling_file

`plugins:local_log_stream:rolling_file` is a boolean which specifies that the logging plugin creates a new log file each day to prevent the log file from growing indefinitely. In this model, the stream appends the current date to the configured filename. This produces a complete filename, for example:

```
/var/adm/artix.log.02172005
```

A new file begins with the first event of the day and ends at 23:59:59 each day. The default behavior is `true`. To disable rolling file behavior, set this variable to false. For example:

```
plugins:local_log_stream:rolling_file = "false";
```

Locator Service

Overview

The locator service plug-in, `service_locator`, has the following configuration variables:

- `plugins:locator:peer_timeout`
- `plugins:locator:persist_data`
- `plugins:locator:selection_method`
- `plugins:locator:wsdl_port`

plugins:locator:peer_timeout

`plugins:locator:peer_timeout` specifies the amount of time, in milliseconds, that the locator plug-in waits between keep-alive pings of the endpoints that are registered with it. The default is `4000000` (4 seconds).

The locator uses a third-party peer manager to ping its endpoints. For more details, see "Peer Manager" on page 130.

plugins:locator:persist_data

`plugins:locator:persist_data` enables persistence in the locator. This variable specifies whether the locator uses a persistent database to store references. For example:

```
plugins:locator:persist_data="true";
```

Defaults to `false`, which means that the locator uses an in-memory map to store references. When replicating the locator you must set `persist_data` to `true`. If you do not, replication does not work.

plugins:locator:selection_method

plugins:locator:selection_method specifies the load balancing selection method used by the locator.

When `plugins:locator:persist_data` is set to `true`, the locator to switches from round robin to random load balancing.

You can change the default behavior of the locator to always use random load balancing by setting the following:

```
plugins:locator:selection_method = “random”;
```

plugins:locator:wsdl_port

`plugins:locator:wsdl_port` specifies a locator WSDL port for a locator replica service. This allows the locator to specify the WSDL port that it uses when registering its own servant. This feature enables forwarding of write requests from a slave to a master locator. The following is an example setting:

```
plugins:locator:wsdl_port=Locator1;
```

Locator Endpoint Manager

Overview

The locator endpoint manager plug-in, `locator_endpoint`, has the following configuration variables:

- `plugins:locator_endpoint:exclude_endpoints`
- `plugins:locator_endpoint:include_endpoints`
- `plugins:locator_endpoint:peer_timeout`

plugins:locator_endpoint:exclude_endpoints

`plugins:locator_endpoint:exclude_endpoints` specifies endpoints to be exluded from the locator. For example, if do not you want to register the container service, but want to register all the endpoints that are activated in that container, use the following setting:

```
plugins:locator_endpoint:exclude_endpoints =
   ["{http://ws.iona.com/container}ContainerService"];
```

You can also wildcard your service names. This enables you to filter based on a specified namespace. For example:

```
plugins:locator_endpoint:exclude_endpoints =
   ["{http://www.sample.com/finance}*"];
```

plugins:locator_endpoint:include_endpoints

`plugins:locator_endpoint:include_endpoints` specifies endpoints to be included in the locator. For example, if you only want to register the session manager, but not any of the endpoints that it manages, use the following setting:

```
plugins:locator_endpoint:include_endpoints =
   ["{http://ws.iona.com/sessionmanager}SessionManagerService"];
```

You can also wildcard your service names. This enables you to filter based on a namespace. For example:

```
plugins:locator_endpoint:include_endpoints =
   ["{http://www.sample.com/finance}*"];
```

Note: Combining the `exclude_endpoints` and `include_endpoints` variables is ambiguous. If you do this, the application will fail to initialize.

plugins:locator_endpoint:peer_timeout

`plugins:locator:peer_timeout` specifies the amount of time, in milliseconds, that the locator endpoint plug-in waits between keep-alive pings back to the locator. The default is `10000` milliseconds (10 seconds).

The locator service endpoint uses a third-party peer manager to ping back to the locator. For more details, see "Peer Manager" on page 130.

Peer Manager

Overview

The peer manager is used by the locator and session manager to ping their endpoints and verify that they are still running. The `peer_manager` plug-in is transparently loaded by the following plug-ins:

- `service_locator`
- `locator_endpoint`
- `session_manager_service`
- `session_endpoint_manager`

The `peer_manager` includes the following configuration variables:

- `plugins:peer_manager:timeout_delta`

plugins:peer_manager:timeout_delta

`plugins:peer_manager:timeout_delta` specifies the time allowed for failover detection in milliseconds. The default is `2000`. For example, increasing this to `10000` ensures that only a real failure results in an endpoint being removed from the locator's list of endpoints.

Response Time Collector

Overview

The Artix response time collector plug-in configures settings for Artix performance logging. The response time collector plug-in periodically collects data from the response monitor plug-in and logs the results. See the *Deploying and Managing Artix Solutions* for full details of Artix performance logging.

The response time collector plug-in includes the following variables:

- `plugins:it_response_time_collector:client-id`.
- `plugins:it_response_time_collector:filename`.
- `plugins:it_response_time_collector:log_properties`.
- `plugins:it_response_time_collector:period`.
- `plugins:it_response_time_collector:server-id`.
- `plugins:it_response_time_collector:syslog_appID`.
- `plugins:it_response_time_collector:system_logging_enabled`.

plugins:it_response_time_collector:client-id

plugins:it_response_time_collector:client-id specifies a client ID that is reported in your log messages. For example:

```
plugins:it_response_time_collector:client-id = "my_client_app";
```

This setting enables management tools to recognize log messages from client applications. This setting is optional; and if omitted, it is assumed that that a server is being monitored.

plugins:it_response_time_collector:filename

plugins:it_response_time_collector:filename specifies the location of the performance log file for a C++ application. For example:

```
plugins:it_response_time_collector:filename =
"/var/log/my_app/perf_logs/treasury_app.log";
```

plugins:it_response_time_collector:log_properties

plugins:it_response_time_collector:log_properties specifies the Apache Log4J details. Artix Java applications use Apache Log4J instead of the log filename used for C++. For example:

```
plugins:it_response_time_collector:log_properties = ["log4j.rootCategory=INFO, A1",
"log4j.appender.A1=com.iona.management.logging.log4jappender.TimeBasedRollingFileAppender",
"log4j.appender.A1.File="/var/log/my_app/perf_logs/treasury_app.log",
"log4j.appender.A1.MaxFileSize=512KB",
"log4j.appender.A1.layout=org.apache.log4j.PatternLayout",
"log4j.appender.A1.layout.ConversionPattern=%d{ISO8601} %-80m %n"
];
```

plugins:it_response_time_collector:period

plugins:it_response_time_collector:period specifies how often an application should log performance data. For example, the following setting specifies that an application should log performance data every 90 seconds:

```
plugins:it_response_time_collector:period = "90";
```

If you do not specify the response time period, it defaults to 60 seconds.

plugins:it_response_time_collector:server-id

plugins:it_response_time_collector:server-id specifies a server ID that will be reported in your log messages. This server ID is particularly useful in the case where the server is a replica that forms part of a cluster.

In a cluster, the server ID enables management tools to recognize log messages from different replica instances. For example:

```
plugins:it_response_time_collector:server-id = "my_server_app1";
```

This setting is optional; and if omitted, the server ID defaults to the ORB name of the server. In a cluster, each replica must have this value set to a unique value to enable sensible analysis of the generated performance logs.

plugins:it_response_time_collector:syslog_appID

`plugins:it_response_time_collector:syslog_appID` specifies an application name that is prepended to all syslog messages. If you do not specify an ID, it defaults to `iona`. For example:

```
plugins:it_response_time_collector:syslog_appID = "treasury";
```

plugins:it_response_time_collector:system_logging_enabled

plugins:it_response_time_collector:system_logging_enabled specifies whether system logging is enabled. For example:

```
plugins:it_response_time_collector:system_logging_enabled = "true";
```

This enables you to configure the collector to log to a syslog daemon or Windows event log.

Routing Plug-in

Overview

The routing plug-in uses the following variables:

- plugins:routing:proxy_cache_size
- plugins:routing:reference_cache_size
- plugins:routing:wsdl_url
- plugins:routing:use_bypass
- plugins:routing:use_pass_through

plugins:routing:proxy_cache_size

plugins:routing:proxy_cache_size specifies the maximum number of proxified server references in the router. This is the number of references that have been converted into a proxy and are ready for invocation.

plugins:routing:proxy_cache_size works in conjunction with plugins:routing:reference_cache_size. Having a smaller setting for proxy_cache_size enables the router to conserve memory, while still being ready for invocations. This is because proxified references use more resources than unproxified references (for example, for client connections and bindings). The default setting is:

```
plugins:routing:proxy_cache_size="50";
```

The router caches references on a least recently used basis in the following order: proxified, unproxified. A proxified reference is demoted to an unproxified reference when the proxy_cache_size limit is reached. Unproxified references are promoted to proxies upon invocation.

For example, take a SOAP-HTTP client and CORBA server banking system with 1,500 accounts. By default, the 50 most recently used accounts are present in the router as proxified references. The next 1450 most recently used are unproxified references.

Note: Router proxification is available for the following bindings and transports: CORBA, SOAP, HTTP, and IIOP Tunnel.

plugins:routing:reference_cache_size

`plugins:routing:reference_cache_size` specifies the maximum number of unproxified server references in the router. This refers to the number of references that must be proxified before they can be invoked on. `plugins:routing:reference_cache_size` works in conjunction with `plugins:routing:proxy_cache_size`. Having a larger setting for `reference_cache_size` enables the router to conserve memory, while still being ready for invocations. Unproxified references use less resources than proxies (for example, for client connections and bindings). The default setting is unbounded:

```
plugins:routing:reference_cache_size="-1";
```

The router caches transient references on a least recently used basis in the following order: proxified, unproxified. Unproxified references are promoted to proxies upon invocation. For an example, see `plugins:routing:proxy_cache_size`.

plugins:routing:wsdl_url

`plugins:routing:wsdl_url` specifies the URL to search for Artix contracts that contain the routing rules for your application. This value can point to WSDL in any location, it does not need to be on the local machine.

This value can be either a single URL or a list of URLs. If your application is using the routing plug-in, you must specify a value for this variable. The following example is from a default `artix.cfg` file:

```
plugins:routing:wsdl_url="../wsdl/router.wsdl";
```

Note: This variable does not accept a mixture of back slashes and forward slashes. You must specify locations using only "\" or "/".

plugins:routing:use_bypass

`plugins:routing:use_bypass` applies to CORBA applications only. It enables you to use CORBA location forwarding to connect CORBA clients directly to CORBA servers, bypassing the Artix `routing` plug-in. `plugins:routing:use_bypass` specifies whether the router sends CORBA `LocateReply` messages back to the client. The default is `false`.

When bypass is enabled, the router receives the first message from the client, determines the destination address, but does not send the message. Instead, it sends a `LocateReply` message that contains the destination address back to the client. The client resends the message to the destination, and sends future messages directly to the destination, bypassing the router completely. This is a standard CORBA feature on the client side. If the destination server dies, the client receives an exception, and on the next attempt, the message is sent to the router, which can redirect it again.

`plugins:routing:use_bypass` and `plugins:routing:use_pass_through` can both be set together. Bypass is used for CORBA-only applications, while pass-through applies in all other cases. Bypass gives best performance because the router effectively disappears. However, pass-through may be preferable in the following cases:

- Bypass is disabled for `multiRoute=failover` routes.
- Bypass changes load balancing behavior. The router cannot tell when a server has failed, so it continues to forward clients to a failed server.
- Bypass is disabled for per-operation, fan-out, and transport-attribute routes.
- Bypassed clients must be able to connect directly to the destination servers. Bypass is not suitable if the router is being used as part of a firewall, or as a connection concentrator.

plugins:routing:use_pass_through

`plugins:routing:use_pass_through` specifies whether the router receives a message and sends it directly to the destination without parsing. This only applies when the source and destination use the same binding.

The default is `true`. The router copies the message buffer directly from the source endpoint to the destination endpoint (if both use the same binding). This disables reference proxification for same-protocol routes (for example, HTTP-to-HTTP).

However, if you want all connections to go through the router, set this variable to `false`. This means that all references are used across the router.

Note: Some attributes are carried in the message body, instead of by the transport. Such attributes are always propagated when the pass-through optimization is in effect, regardless of attribute propagation rules.

WARNING: Do *not* enable pass-through in a secure router. When pass-through is enabled, the authentication and authorization steps are skipped. Therefore, you must always set `plugins:routing:use_pass_through` to `false` in a secure router. See IONA Security Advisory, ISA130905.

Service Lifecycle

Overview

The service lifecycle plug-in enables garbage collection of old or unused proxy services. Dynamic proxy services are used when the Artix router bridges services that have patterns such as callback, factory, or any interaction that passes references to other services. When the router encounters a reference in a message, it proxifies the reference into one that a receiving application can use. For example, an IOR from a CORBA server cannot be used by a SOAP client, so a new route is dynamically created for the SOAP client.

However, dynamic proxies persist in the router memory and can have a negative effect on performance. You can overcome this by using service garbage collection to clean up old proxy services that are no longer used. This cleans up unused proxies when a threshold has been reached on a least recently used basis.

The Artix `plugins:service_lifecycle` namespace has the following variable:

`plugins:service_lifecycle:max_cache_size`

plugins:service_lifecycle:max_cache_size

`plugins:service_lifecycle:max_cache_size` specifies the maximum cache size of servants managed by the `service_lifecycle` plug-in. For example:

```
plugins:service_lifecycle:max_cache_size = "30";
```

To enable service lifecycle, you must also add the `service_lifecycle` plug-in to the `orb_plugins` list, for example:

```
orb_plugins = ["xmlfile_log_stream", "service_lifecycle",
   "routing"];
```

When writing client applications, you must make allowances for the garbage collection service; in particular, ensure that exceptions are handled appropriately.

For example, a client may attempt to proxify to a service that has already been garbage collected. To prevent this, do either of the following:

- Handle the exception, get a new reference, and continue. However, in some cases, this may not be possible if the service has state.
- Set `max_cache_size` to a reasonable limit to ensure that all your clients can be accommodated. For example, if you always expect to support `20` concurrent clients, each with a transient service session, you might wish to configure the `max_cache_size` to `30`.

You must not impact any clients, and ensure that a service is no longer needed when it is garbage collected. However, if you set `max_cache_size` too high, this may use up too much router memory and have a negative impact on performance. For example, a suggested range for this setting is `30-100`.

Note: For a more scalable approach to managing proxies, see `plugins:routing:proxy_cache_size` and `plugins:routing:reference_cache_size`. This uses a single default servant (instead of the multiple servants used by service lifecycle), thereby minimizing the impact on router resources.

Session Manager

Overview

The session manager, `session_manager_service`, has the following configuration variables:

- `plugins:session_manager_service:peer_timeout`

plugins:session_manager_service:peer_timeout

`plugins:session_manager_service:peer_timeout` specifies the amount of time, in milliseconds, that the session manager plug-in waits between keep-alive pings of the endpoints registered with it. The default is `4000000` (`4` seconds).

The session manager uses a third-party peer manager to ping its endpoints For more details, see "Peer Manager" on page 130.

Session Endpoint Manager

Overview

The session endpoint manager plug-in, `session_endpoint_manager`, has the following configuration variables:

- `plugins:session_endpoint_manager:default_group`
- `plugins:session_endpoint_manager:header_validation`
- `plugins:session_endpoint_manager:peer_timeout`

plugins:session_endpoint_manager:default_group

`plugins:session_endpoint_manager:default_group` specifies the default group name for all endpoints that are instantiated using the configuration scope.

plugins:session_endpoint_manager:header_validation

`plugins:session_endpoint_manager:header_validation` specifies whether or not a server validates the session headers passed to it by clients. Default value is `true`.

plugins:session_endpoint_manager:peer_timeout

`plugins:session_endpoint_manager:peer_timeout` specifies the amount of time, in milliseconds, the session endpoint manager plug-in waits between keep-alive pings back to the session manager. The default is `4000000` (4 seconds).

The session endpoint manager uses a third-party peer manager to ping back to the session manager. For more details, see "Peer Manager" on page 130.

Session Manager Simple Policy

Overview

The session manager's simple policy plug-in, `sm_simple_policy`, has the following configuration variables:

- `plugins:sm_simple_policy:max_concurrent_sessions`
- `plugins:sm_simple_policy:min_session_timeout`
- `plugins:sm_simple_policy:max_session_timeout`

plugins:sm_simple_policy:max_concurrent_sessions

`plugins:sm_simple_policy:max_concurrent_sessions` specifies the maximum number of concurrent sessions the session manager will allocate. Default value is `1`.

plugins:sm_simple_policy:min_session_timeout

`plugins:sm_simple_policy:min_session_timeout` specifies the minimum amount of time, in seconds, allowed for a session's timeout setting. Zero means the unlimited. Default is `5`.

plugins:sm_simple_policy:max_session_timeout

`plugins:sm_simple_policy:max_session_timeout` specifies the maximum amount of time, in seconds, allowed for a session's timesout setting. Zero means the unlimited. Default is `600`.

SOAP Plug-in

Overview

The SOAP plug-in (soap) has the following configuration settings:

- `plugins:soap:encoding`
- `plugins:soap:write_xsi_type`

plugins:soap:encoding

`plugins:soap:encoding` specifies the character encoding used when the SOAP plugin writes service requests or notification broadcasts to the wire. The valid settings are fully qualified IANA codeset names (Internet Assigned Numbers Authority). The default value is `UTF-8`. By default, this variable is not listed in the `artix.cfg` file.

For a listing of valid codesets visit the IANA's website (http://www.iana.org/assignments/character-sets).

plugins:soap:write_xsi_type

`plugins:soap:write_xsi_type` specifies whether to write the types of message parts in the log file. When set to `true`, this identifies each of the types associated with the message parts in the log file.

This only affects the content of the log file, giving you more information on the type contained in each message part. This variable for very useful for debugging purposes.

Transformer Service

Overview

The Artix transformer service uses Artix endpoints that are configured in its configuration scope using the `artix:endpoint:endpoint_list`. For each endpoint that uses the transformer, you must specify an operation map with the corresponding *`endpoint_name`* from the endpoint list. The `artix:endpoint` namespace contains the following variables:

- artix:endpoint:endpoint_list
- artix:endpoint:endpoint_name:wsdl_location
- artix:endpoint:endpoint_name:wsdl_port

The transformer service, `xslt`, has the following configuration settings:

- plugins:xslt:servant_list
- plugins:xslt:endpoint_name:operation_map

artix:endpoint:endpoint_list

`artix:endpoint:endpoint_list` specifies a list of endpoint names that are used to identify the defined endpoints. Each name in the list represents an endpoint configured with the other variables in this namespace. The endpoint names in this list are used by the Web service chain plugin and the Artix transformer. For example:

```
artix:endpoint:endpoint_list = ["corba", "tunnel"];
```

artix:endpoint:*endpoint_name*:wsdl_location

`artix:endpoint:`*`endpoint_name`*`:wsdl_location` specifies the location of the Artix contract defining this endpoint. For example:

```
artix:endpoint:corba:wsdl_location="C:\myDir/test/wsdl/simple_service.wsdl";
```

artix:endpoint:*endpoint_name*:wsdl_port

`artix:endpoint:`*`endpoint_name`*`:wsdl_port` specifes the `port` that defines the physical representation of the endpoint. Use the following format:

```
[{service_qname}]service_name[/port_name]
```

For example:

```
artix:endpoint:my_endpoint:wsdl_port="{http://www.mycorp.com/}MyService/MyPort";
```

plugins:xslt:servant_list

`plugins:xslt:servant_list` specifies a list of endpoints that are instaniated as servants by the transformer. For example:

```
plugins:xslt:servant_list=["endpoint_one", "endpoint_two" ...]
```

plugins:xslt:*endpoint_name*:operation_map

`plugins:xslt:`*`endpoint_name`*`:operation_map` specifies a list of XSLT operations and scripts to be used in processing the recieved XML messages. This list of scripts is used by each servant to process requests. Each endpoint specified in the servant list has a corresponding operation map entry. The operation map is specified as a list using the syntax .

```
plugins:xslt:endpoint_name:operantion_map = ["wsdlOp1@filename1"
    , "wsdlOp2@filename2", ..., "wsdlOpN@filenameN"];
```

Each entry specifies a logical operation defined in the service contract by an `operation` element, and the XSLT script to run when a request is made on the operation. You must specify an XSLT script for every operation defined. If you do not, the transformer raises an exception when the unmapped operation is invoked.

plugins:xslt:*endpoint_name*:trace_filter

`plugins:xslt:`*`endpoint_name`*`:trace_filter` specifies optional debug settings for the output of the XSLT engine. For example:

```
plugins:xslt:endpoint_name:trace_filter =
   "INPUT+TEMPLATE+ELEMENT+GENERATE+SELECT";
```

These settings are described as follows:

`INPUT`	Traces the XML input passed to the XSLT engine.
`TEMPLATE`	Traces template matches in the XSLT script.
`ELEMENT`	Traces element generation.
`GENERATE`	Traces generation of text and attributes.
`SELECT`	Traces node selections in the XSLT script.

Tuxedo Plug-in

Overview

The Tuxedo plug-in includes the following variable:

- plugins:tuxedo:server

plugins:tuxedo:server

`plugins:tuxedo:server` is a boolean that specifies if the Artix process is a Tuxedo server and must be started using `tmboot`. The default is:

```
plugins:tuxedo:server = "false";
```

Web Service Chain Service

Overview

The Web service chain service refers back to the Artix endpoints configured in its configuration scope using `artix:endpoint:endpoint_list`. For each endpoint that will be part of the chain, you specify a service chain with the corresponding *`endpoint_name`* from the endpoint list.

The Web service chain service, `ws_chain`, uses the following configuration variables:

- plugins:chain:endpoint_name:operation_name:service_chain
- plugins:chain:init_on_first_call
- plugins:chain:servant_list

plugins:chain:*endpoint_name*:*operation_name*:service_chain

`plugins:chain:`*`endpoint_name`*`:`*`operation_name`*`:service_chain` specifies the chain followed by requests made on the operation specified by *`opereration_name`*. The operation must be defined as part of the endpoint specified by *`endpoint_name`*.

Service chains are specified using the following syntax:

```
["operation1@port1","operation2@port2", ..., "operationN@portN"]
```

Each operation and port entry correspond to an `operation` and a `port` in the endpoint's Artix contract. The request is passed through each service in the order specified. The final operation in the list returns the response back to the endpoint.

plugins:chain:init_on_first_call

`plugins:chain:init_on_first_call` specifies whether to instantiate proxy services when a call is made. Defaults to `false`. This means that proxies are instantiated when the chain servant starts.

The chain invokes on other services, and for this reason, must instantiate proxies. This can be done when the chain servant starts (variable set to `false`), or later, when a call is made (variable set to `true`).

You might not be able to properly instantiate proxies when the servant is started because the servant to call is not started. For example, this applies when using the Artix locator or UDDI.

plugins:chain:servant_list

`plugins:chain:servant_list` specifies a list of services in the Web service chain. Each name in the list must correspond to a service specified in the configuration scope. The following simple example shows a list that contains one service:

```
bus:qname_alias:my_client =
   "{http://www.iona.com/xslt}my_client_service";
bus:initial_contract:url:client = "../../etc/my_transformation.wsdl";

...

plugins:chain:servant_list = ["my_client"];
```

WSDL Publishing Service

Overview

The WSDL publishing service, `wsdl_publish`, includes the following configuration variables:

- plugins:wsdl_publish:publish_port
- plugins:wsdl_publish:hostname
- plugins:wsdl_publish:processor

Although all three variables are optional, it is recommended that you define `plugins:wsdl_publish:publish_port` and `plugins:wsdl_publish:hostname` in production environments.

plugins:wsdl_publish:publish_port

`plugins:wsdl_publish:publish_port` specifies the port on which the WSDL publishing service can be contacted.

The default value is `0`, which specifies that `wsdl_publish` will use a port supplied by the operating system at runtime. You can get the `wsdl_publish` URL from the bus.

plugins:wsdl_publish:hostname

`plugins:wsdl_publish:hostname` specifies how the hostname will be published. By default, the local name of the machine will be published. The possible values are as follows:

`canonical`	Publishes the fully qualified hostname of the machine in the dynamic WSDL (for example `http://myhost.mydomain.com`).
`unqualified`	Publishes the unqualified local hostname of the machine in the dynamic WSDL. This does not include domain name with the hostname (for example, `http://myhost`).
`ipaddress`	Publishes the IP address associated with the machine in the dynamic WSDL (for example `http://10.1.2.3`).

Note: See also policies:at_http:server_address_mode_policy:publish_hostname and policies:soap:server_address_mode_policy:publish_hostname.

plugins:wsdl_publish:processor

`plugins:wsdl_publish:processor` specifies the type of preprocessing done before publishing a WSDL contract. The possible values are as follows:

`artix`	Strip out server-side artifacts. This is the default setting.
`standard`	Strip out server side artifacts and IONA proprietary extensors.
none	Disable preprocessing.

XML File Log Stream

Overview

The XML file log stream plug-in, `xmlfile_log_stream`, enables you to view logging output in an XML file. It includes the following variables:

- `plugins:xmlfile_log_stream:buffer_file`
- `plugins:xmlfile_log_stream:filename`
- `plugins:xmlfile_log_stream:log_elements`
- `plugins:xmlfile_log_stream:log_thread_id`
- `plugins:xmlfile_log_stream:milliseconds_to_log`
- `plugins:xmlfile_log_stream:rolling_file`
- `plugins:xmlfile_log_stream:use_pid`

plugins:xmlfile_log_stream:buffer_file

`plugins:xmlfile_log_stream:buffer_file` specifies whether the output stream is sent to a buffer before it writes to a local log file. To specify this behavior, set this variable to `true`:

```
plugins:xmlfile_log_stream:buffer_file = "true";
```

When set to `true`, by default, the buffer is output to a file every 1000 milliseconds when there are more than 100 messages logged. This log interval and number of log elements can also be configured.

plugins:xmlfile_log_stream:filename

`plugins:xmlfile_log_stream:filename` specifies the filename for your log file, for example:

```
plugins:xmlfile_log_stream:filename = "artix_logfile.xml";
```

If you do not specify a file name, logging is sent to `stdout`.

plugins:xmlfile_log_stream:log_elements

`plugins:xmlfile_log_stream:log_elements` specifies the number of log messages that must be in the buffer before they are output to a log file. The default is 100 messages.

For example, the following configuration writes the log output to a log file if there are more than 20 log messages in the buffer.

```
plugins:xmlfile_log_stream:log_elements = "20";
```

plugins:xmlfile_log_stream:log_thread_id

`plugins:xmlfile_log_stream:log_thread_id` specifies whether the thread ID is logged in the log message or not, for example:

```
plugins:xmlfile_log_stream:log_thread_id = "true";
```

The default is `true`.

plugins:xmlfile_log_stream:milliseconds_to_log

`plugins:xmlfile_log_stream:milliseconds_to_log` specifies how often in milliseconds that the log buffer is output to a log file. The default is 1000 milliseconds.

For example, the following configuration writes the log output to a log file every 400 milliseconds.

```
plugins:xmlfile_log_stream:milliseconds_to_log = "400";
```

plugins:xmlfile_log_stream:rolling_file

`plugins:xmlfile_log_stream:rolling_file` is a boolean which specifies that the logging plugin creates a new log file each day to prevent the log file from growing indefinitely. In this model, the stream appends the current date to the configured filename. This produces a complete filename, for example:

```
/var/adm/artix.log.02172005
```

A new file begins with the first event of the day and ends at 23:59:59 each day. The default behavior is `true`. To disable rolling file behavior, set this variable to false. For example:

```
plugins:xmlfile_log_stream:rolling_file = "false";
```

plugins:xmlfile_log_stream:use_pid

`plugins:xmlfile_log_stream:use_pid` specifies that the logging plug-in uses a optional process identifier. The default is `false`. To enable the process identifier, set this variable to `true`:

```
plugins:xmlfile_log_stream:use_pid = "true";
```

Custom Plug-ins

Overview

When you write a custom plug-in for Artix, using either C++ or Java, you must provide some configuration to the Artix runtime so that Artix can locate the libraries and initial settings required to properly instantiate the plug-in. This information is provided in the Artix configuration file used by your application. Typically, you would place the information in the global scope so that more than one of your applications can use the plug-in.

C++ plug-in libraries

When writing custom C++ plug-ins you build your plug-in as a shared library that the bus loads at runtime. In the Artix configuration file, you need to provide the name of the shared library that loads the plug-in. You can do this using the following configuration variable:

`plugins:`*`PluginName`*`:shlib_name`

The plug-in name provided must correspond to the plug-in name that is listed in the `orb_plugins` list.

Example 15 shows an example of configuring a custom plug-in called `my_filter` that is implemented by the shared library `my_filter.dll`.

Example 15: *Custom C++ Plug-in Configuration*

```
plugins:my_filter:shlib_name="my_filter"
...
my_app
{
  orb_plugins=["my_filter" ...];
  ...
}
```

Java plug-in classes

Java plug-ins are loaded using the plug-in factory you implemented for the custom plugin. In the Artix configuration file, you must provide that name for the plug-in factory class. You can do this using the following configuration variable:

`plugins:`*`PluginName`*`:`*`ClassName`*.

The plug-in name provided must correspond to the plug-in name listed in the `orb_plugins` list. Example 16 shows an example of configuring a custom plug-in called `my_java_filter` that has the factory class `myJavaFilterFactory`.

Example 16: *Custom Java Plug-in Configuration*

```
plugins:my_java_filter:shlib_name="myJavaFilterFactory"
...
my_app
{
  orb_plugins=[..., "java"];
  java_plugins=["my_java_filter"];
  ...
}
```

Plug-in dependencies

In addition to providing a pointer to the plug-in's implementation, you can also provide a list of plug-ins that your plug-in requires to be loaded. You can provide this information using the following configuration variable:

`plugins:`*`PluginName`*`:prerequisite_plugins`.

The prerequisite plug-ins are specified as a list of plug-in names similar to that specified in the `orb_plugins` list. When you provide this list the bus ensures that the required plug-ins are loaded whenever your plug-in is loaded.

Example 17 shows configuring some prerequisite plug-ins for a custom plug-in called `my_filter`.

Example 17: *Custom Prerequisite Plug-in Configuration*

```
plugins:my_filter:prerequisite_plugins = ["my_plugin_1",
   "my_plugin_2", "my_plugin_3", "my_plugin4"];
```

The syntax is the same for Java and C++ applications.

CHAPTER 7

Artix Security

This chapter describes variables used by the IONA Security Framework. The Artix security infrastructure is highly configurable.

In this chapter

This chapter discusses the following topics:

Applying Constraints to Certificates

Certificate constraints policy

You can use the `CertConstraintsPolicy` to apply constraints to peer X.509 certificates by the default `CertificateValidatorPolicy`. These conditions are applied to the owner's distinguished name (DN) on the first certificate (peer certificate) of the received certificate chain. Distinguished names are made up of a number of distinct fields, the most common being Organization Unit (OU) and Common Name (CN).

Configuration variable

You can specify a list of constraints to be used by `CertConstraintsPolicy` through the `policies:iiop_tls:certificate_constraints_policy` or `policies:https:certificate_constraints_policy` configuration variables. For example:

```
policies:iiop_tls:certificate_constraints_policy =
   ["CN=Johnny*,OU=[unit1|IT_SSL],O=IONA,C=Ireland,ST=Dublin,L=Ea
   rth","CN=Paul*,OU=SSLTEAM,O=IONA,C=Ireland,ST=Dublin,L=Earth",
"CN=TheOmnipotentOne"];
```

Constraint language

These are the special characters and their meanings in the constraint list:

`*`	Matches any text. For example: `an*` matches `ant` and `anger`, but not `aunt`
`[ ]`	Grouping symbols.
`|`	Choice symbol. For example: `OU=[unit1|IT_SSL]` signifies that if the `OU` is `unit1` or `IT_SSL`, the certificate is acceptable.
`=, !=`	Signify equality and inequality respectively.

Example

This is an example list of constraints:

```
policies:iiop_tls:certificate_constraints_policy = [
   "OU=[unit1|IT_SSL],CN=Steve*,L=Dublin",
"OU=IT_ART*,OU!=IT_ARTtesters,CN=[Jan|Donal],ST=
Boston" ];
```

This constraint list specifies that a certificate is deemed acceptable if and only if it satisfies one or more of the constraint patterns:

```
If
     The OU is unit1 or IT_SSL
     And
     The CN begins with the text Steve
     And
     The location is Dublin
Then the certificate is acceptable
Else  (moving on to the second constraint)
If
     The OU begins with the text IT_ART but isn't IT_ARTtesters
     And
     The common name is either Donal or Jan
     And
     The State is Boston
Then the certificate is acceptable
Otherwise the certificate is unacceptable.
```

The language is like a boolean OR, trying the constraints defined in each line until the certificate satisfies one of the constraints. Only if the certificate fails all constraints is the certificate deemed invalid.

Note that this setting can be sensitive about white space used within it. For example, `"CN ="` might not be recognized, where `"CN="` is recognized.

Distinguished names

For more information on distinguished names, see the *Security Guide*.

initial_references

The `initial_references` namespace contains the following configuration variables:

- IT_TLS_Toolkit:plugin

IT_TLS_Toolkit:plugin

This configuration variable enables you to specify the underlying SSL/TLS toolkit to be used by Artix. It is used in conjunction with the `plugins:baltimore_toolkit:shlib_name`, `plugins:schannel_toolkit:shlib_name` (Windows only) and `plugins:systemssl_toolkit:shlib_name` (z/OS only) configuration variables to implement SSL/TLS toolkit replaceability.

The default is the Baltimore toolkit.

plugins:asp

The `plugins:asp` namespace contains the following variables:

- authentication_cache_size
- authentication_cache_timeout
- authorization_realm
- default_password
- security_type
- security_level

authentication_cache_size

For SOAP bindings, the maximum number of credentials stored in the authentication cache. If this size is exceeded the oldest credential in the cache is removed.

A value of -1 (the default) means unlimited size. A value of `0` means disable the cache.

authentication_cache_timeout

For SOAP bindings, the time (in seconds) after which a credential is considered *stale*. Stale credentials are removed from the cache and the server must re-authenticate with the Artix security service on the next call from that user.

A value of -1 (the default) means an infinite time-out. A value of `0` means disable the cache.

authorization_realm

Specifies the Artix authorization realm to which an Artix server belongs. The value of this variable determines which of a user's roles are considered when making an access control decision.

For example, consider a user that belongs to the `ejb-developer` and `corba-developer` roles within the `Engineering` realm, and to the `ordinary` role within the `Sales` realm. If you set `plugins:asp:authorization_realm` to `Sales` for a particular server, only the `ordinary` role is considered when making access control decisions (using the action-role mapping file).

The default is `IONAGlobalRealm`.

default_password

When the client credentials originate either from a CORBA Principal (embedded in a SOAP header) or from a certificate subject, the `default_password` variable specifies the password to use on the server side. The `plugins:asp:default_password` variable is used to get around the limitation that a `PRINCIPAL` identity and a `CERT_SUBJECT` are propagated without an accompanying password.

The `artix_security` plug-in uses the received client principal together with the password specified by `plugins:asp:default_password` to authenticate the user through the Artix security service.

The default value is the string, `default_password`.

security_type

(Obsolete) From Artix 3.0 onwards, this variable is ignored.

security_level

Specifies the level from which security credentials are picked up. The following options are supported by the `artix_security` plug-in:

`MESSAGE_LEVEL`	Get security information from the transport header. This is the default.
`REQUEST_LEVEL`	Get the security information from the message header.

plugins:at_http

The `plugins:at_http` configuration variables are provided to facilitate migration from legacy Artix applications (that is, Artix releases prior to version 3.0). The `plugins:at_http` namespace contains variables that are similar to the variables from the old (pre-version 3.0) `plugins:http` namespace. One important change made in 3.0, however, is that an application's own certificate must now be provided in PKCS#12 format (where they were previously supplied in PEM format).

If the variables from the `plugins:at_http` namespace are used, they take precedence over the analogous variables from the `principal_sponsor:https` and `policies:https` namespaces.

The `plugins:at_http` namespace contains the following variables:

- client:client_certificate.
- client:client_private_key_password.
- client:trusted_root_certificates.
- client:use_secure_sockets.
- server:server_certificate.
- server:server_private_key_password.
- server:trusted_root_certificates.
- server:use_secure_sockets.

client:client_certificate

This variable specifies the full path to the PKCS#12-encoded X.509 certificate issued by the certificate authority for the client. For example:

```
plugins:at_http:client:client_certificate =
   "C:\aspen\x509\certs\key.cert.p12"
```

client:client_private_key_password

This variable specifies the password to decrypt the contents of the PKCS#12 certificate file specified by `client:client_certificate`.

client:trusted_root_certificates

This variable specifies the path to a file containing a concatenated list of CA certificates in PEM format. The client uses this CA list during the TLS handshake to verify that the server's certificate has been signed by a trusted CA.

client:use_secure_sockets

The effect of the `client:use_secure_sockets` variable depends on the type of URL specifying the remote service location:

- `https://host:port` URL format—the client always attempts to open a secure connection. That is, the value of `plugins:at_http:client:use_secure_sockets` is effectively ignored.
- `http://host:port` URL format—whether the client attempts to open a secure connection or not depends on the value of `plugins:at_http:client:use_secure_sockets`, as follows:
  - `true`—the client attempts to open a secure connection (that is, HTTPS running over SSL or TLS). If no port is specified in the `http` URL, the client uses port 443 for secure HTTPS.
  - `false`—the client attempts to open an insecure connection (that is, plain HTTP).

If `plugins:at_http:client:use_secure_sockets` is `true` and the client decides to open a secure connection, the `at_http` plug-in then automatically loads the `https` plug-in.

Note: If `plugins:at_http:client:use_secure_sockets` is `true` and the client decides to open a secure connection, Artix effectively uses the following client secure invocation policies:

```
    policies:https:client_secure_invocation_policy:requires =
["Confidentiality","Integrity", "DetectReplay",
"DetectMisordering", "EstablishTrustInTarget"];

    policies:https:client_secure_invocation_policy:supports =
["Confidentiality", "Integrity", "DetectReplay",
"DetectMisordering", "EstablishTrustInTarget",
"EstablishTrustInClient"];
```

server:server_certificate

This variable specifies the full path to the PKCS#12-encoded X.509 certificate issued by the certificate authority for the server. For example:

```
plugins:at_http:server:server_certificate =
   "c:\aspen\x509\certs\key.cert.p12"
```

server:server_private_key_password

This variable specifies the password to decrypt the contents of the PKCS#12 certificate file specified by `server:server_certificate`.

server:trusted_root_certificates

This variable specifies the path to a file containing a concatenated list of CA certificates in PEM format. The server uses this CA list during the TLS handshake to verify that the client's certificate has been signed by a trusted CA.

server:use_secure_sockets

The effect of the `server:use_secure_sockets` variable depends on the type of URL advertising the service location:

- `https://`*`host`*`:`*`port`* URL format—the server accepts only secure connection attempts. That is, the value of `plugins:at_http:server:use_secure_sockets` is effectively ignored.
- `http://`*`host`*`:`*`port`* URL format—whether the server accepts secure connection attempts or not depends on the value of `plugins:at_http:server:use_secure_sockets`, as follows:
  - `true`—the server accepts secure connection attempts (that is, HTTPS running over SSL or TLS). If no port is specified in the `http` URL, the server uses port 443 for secure HTTPS.
  - `false`—the server accepts insecure connection attempts (that is, plain HTTP).

If `plugins:at_http:server:use_secure_sockets` is set and the server accepts a secure connection, the `at_http` plug-in then automatically loads the `https` plug-in.

Note: If `plugins:at_http:server:use_secure_sockets` is set and the server accepts a secure connection, Artix effectively uses the following server secure invocation policies:

```
    policies:https:server_secure_invocation_policy:requires =
["Confidentiality","Integrity", "DetectReplay",
"DetectMisordering", "EstablishTrustInClient"];

    policies:https:server_secure_invocation_policy:supports =
["Confidentiality", "Integrity", "DetectReplay",
"DetectMisordering", "EstablishTrustInTarget",
"EstablishTrustInClient"];
```

plugins:atli2_tls

The `plugins:atli2_tls` namespace contains the following variable:

- use_jsse_tk

use_jsse_tk

(Java only) Specifies whether or not to use the JSSE/JCE architecture with the CORBA binding. If `true`, the CORBA binding uses the JSSE/JCE architecture to implement SSL/TLS security; if `false`, the CORBA binding uses the Baltimore SSL/TLS toolkit.

The default is `false`.

plugins:csi

The `policies:csi` namespace includes variables that specify settings for Common Secure Interoperability version 2 (CSIv2):

- `ClassName`
- `shlib_name`

ClassName

`ClassName` specifies the Java class that implements the `csi` plugin. The default setting is:

```
plugins:csi:ClassName = "com.iona.corba.security.csi.CSIPlugin";
```

This configuration setting makes it possible for the Artix core to load the plugin on demand. Internally, the Artix core uses a Java class loader to load and instantiate the `csi` class. Plugin loading can be initiated either by including the `csi` in the `orb_plugins` list, or by associating the plugin with an initial reference.

shlib_name

`shlib_name` identifies the shared library (or DLL in Windows) containing the `csi` plugin implementation.

```
plugins:csi:shlib_name = "it_csi_prot";
```

The `csi` plug-in becomes associated with the `it_csi_prot` shared library, where `it_csi_prot` is the base name of the library. The library base name, `it_csi_prot`, is expanded in a platform-dependent manner to obtain the full name of the library file.

plugins:gsp

The `plugins:gsp` namespace includes variables that specify settings for the Generic Security Plugin (GSP). This provides authorization by checking a user's roles against the permissions stored in an action-role mapping file. It includes the following:

- `accept_asserted_authorization_info`
- `action_role_mapping_file`
- `assert_authorization_info`
- `authentication_cache_size`
- `authentication_cache_timeout`
- `authorization_realm`
- `ClassName`
- `enable_authorization`
- `enable_gssup_sso`
- `enable_user_id_logging`
- `enable_x509_sso`
- `enforce_secure_comms_to_sso_server`
- `enable_security_service_cert_authentication`
- `sso_server_certificate_constraints`
- `use_client_load_balancing`

accept_asserted_authorization_info

If `false`, SAML data is not read from incoming connections. Default is `true`.

action_role_mapping_file

Specifies the action-role mapping file URL. For example:

```
plugins:gsp:action_role_mapping_file =
   "file:///my/action/role/mapping";
```

assert_authorization_info

If `false`, SAML data is not sent on outgoing connections. Default is `true`.

authentication_cache_size

The maximum number of credentials stored in the authentication cache. If this size is exceeded the oldest credential in the cache is removed.

A value of -1 (the default) means unlimited size. A value of `0` means disable the cache.

authentication_cache_timeout

The time (in seconds) after which a credential is considered *stale*. Stale credentials are removed from the cache and the server must re-authenticate with the Artix security service on the next call from that user. The cache timeout should be configured to be smaller than the timeout set in the `is2.properties` file (by default, that setting is `is2.sso.session.timeout=600`).

A value of -1 (the default) means an infinite time-out. A value of `0` means disable the cache.

authorization_realm

`authorization_realm` specifies the iSF authorization realm to which a server belongs. The value of this variable determines which of a user's roles are considered when making an access control decision.

For example, consider a user that belongs to the `ejb-developer` and `corba-developer` roles within the `Engineering` realm, and to the ordinary role within the Sales realm. If you set `plugins:gsp:authorization_realm` to Sales for a particular server, only the ordinary role is considered when making access control decisions (using the `action-role` mapping file).

ClassName

`ClassName` specifies the Java class that implements the `gsp` plugin. This configuration setting makes it possible for the Artix core to load the plugin on demand. Internally, the Artix core uses a Java class loader to load and instantiate the `gsp` class. Plugin loading can be initiated either by including the `csi` in the `orb_plugins` list, or by associating the plugin with an initial reference.

enable_authorization

A boolean GSP policy that, when `true`, enables authorization using action-role mapping ACLs in server.

Default is `true`.

enable_gssup_sso

Enables SSO with a username and a password (that is, GSSUP) when set to `true`.

enable_user_id_logging

A boolean variable that enables logging of user IDs on the server side. Default is `false`.

Up until the release of Orbix 6.1 SP1, the GSP plug-in would log messages containing user IDs. For example:

```
[junit] Fri, 28 May 2004 12:17:22.0000000 [SLEEPY:3284]
   (IT_CSI:205) I - User alice authenticated successfully.
```

In some cases, however, it might not be appropriate to expose user IDs in the Orbix log. From Orbix 6.2 onward, the default behavior of the GSP plug-in is changed, so that user IDs are *not* logged by default. To restore the pre-Orbix 6.2 behavior and log user IDs, set this variable to `true`.

enable_x509_sso

Enables certificate-based SSO when set to `true`.

enforce_secure_comms_to_sso_server

Enforces a secure SSL/TLS link between a client and the login service when set to `true`. When this setting is true, the value of the SSL/TLS client secure invocation policy does *not* affect the connection between the client and the login service.

Default is `true`.

enable_security_service_cert_authentication

A boolean GSP policy that enables X.509 certificate-based authentication on the server side using the Artix security service.

Default is `false`.

sso_server_certificate_constraints

A special certificate constraints policy that applies *only* to the SSL/TLS connection between the client and the SSO login server. For details of the pattern constraint language, see "Applying Constraints to Certificates" on page 159.

use_client_load_balancing

A boolean variable that enables load balancing over a cluster of security services. If an application is deployed in a domain that uses security service clustering, the application should be configured to use *client load balancing* (in this context, *client* means a client of the Artix security service). See also `policies:iiop_tls:load_balancing_mechanism`.

Default is `true`.

plugins:http

The `plugins:http` namespace contains the following variables:

- `client:client_certificate`
- `client:client_certificate_chain`
- `client:client_private_key`
- `client:client_private_key_password`
- `client:trusted_root_certificates`
- `client:use_secure_sockets`
- `server:server_certificate`
- `server:server_certificate_chain`
- `server:server_private_key`
- `server:server_private_key_password`
- `server:trusted_root_certificates`
- `server:use_secure_sockets`

client:client_certificate

This variable specifies the full path to the PEM-encoded X.509 certificate issued by the certificate authority for the client. For example:

```
plugins:http:client:client_certificate =
   "c:\aspen\x509\certs\key.cert.pem"
```

This setting is ignored if `plugins:http:client:use_secure_sockets` is `false`.

client:client_certificate_chain

(Optional) This variable specifies the full path to the PEM-encoded X.509 certificate chain for the client. For example:

```
plugins:http:client:client_certificate_chain =
   "c:\aspen\x509\certs\key.cert.pem"
```

This setting is ignored if `plugins:http:client:use_secure_sockets` is `false`.

client:client_private_key

This variable specifies a PEM file containing the client certificate's encrypted private key. This private key enables the client to respond to a challenge from a server during an SSL/TLS handshake.

This setting is ignored if `plugins:http:client:use_secure_sockets` is `false`.

client:client_private_key_password

This variable specifies the password to decrypt the contents of the `client_private_key` file.

This setting is ignored if `plugins:http:client:use_secure_sockets` is `false`.

client:trusted_root_certificates

This variable specifies the path to a file containing a concatenated list of CA certificates in PEM format. The client uses this CA list during the TLS handshake to verify that the server's certificate has been signed by a trusted CA.

This setting is ignored if `plugins:http:client:use_secure_sockets` is `false`.

client:use_secure_sockets

This variable specifies whether the client wants to open a HTTPS connection (that is, HTTP running over SSL or TLS) or an insecure connection (that is, plain HTTP).

Valid values are `true`, for HTTPS, and `false`, for HTTP. The default is `false`.

server:server_certificate

This variable specifies the full path to the PEM-encoded X.509 certificate issued by the certificate authority for the server. For example:

```
plugins:http:server:server_certificate =
   "c:\aspen\x509\certs\key.cert.pem"
```

This setting is ignored if `plugins:http:server:use_secure_sockets` is `false`.

server:server_certificate_chain

(Optional) This variable specifies the full path to the PEM-encoded X.509 certificate chain for the server. For example:

```
plugins:http:server:server_certificate_chain =
   "c:\aspen\x509\certs\key.cert.pem"
```

This setting is ignored if `plugins:http:server:use_secure_sockets` is `false`.

server:server_private_key

This variable specifies a PEM file containing the server certificate's encrypted private key. This private key enables the server to respond to a challenge from a client during an SSL/TLS handshake.

This setting is ignored if `plugins:http:server:use_secure_sockets` is `false`.

server:server_private_key_password

This variable specifies the password to decrypt the contents of the `server_private_key` file.

This setting is ignored if `plugins:http:server:use_secure_sockets` is `false`.

server:trusted_root_certificates

This variable specifies the path to a file containing a concatenated list of CA certificates in PEM format. The server uses this CA list during the TLS handshake to verify that the client's certificate has been signed by a trusted CA.

This setting is ignored if `plugins:http:server:use_secure_sockets` is `false`.

server:use_secure_sockets

This variable specifies whether the server accepts HTTPS connection attempts (that is, HTTP running over SSL or TLS) or insecure connection attempts (that is, plain HTTP) from a client.

Valid values are `true`, for HTTPS, and `false`, for HTTP. The default is `false`.

plugins:https

The `plugins:https` namespace contains the following variable:

- ClassName

ClassName

(Java only) This variable specifies the class name of the `https` plug-in implementation. For example:

```
plugins:https:ClassName = "com.iona.corba.https.HTTPSPlugIn";
```

plugins:iiop_tls

The `plugins:iiop_tls` namespace contains the following variables:

buffer_pool:recycle_segments

(Java only) When this variable is set, the `iiop_tls` plug-in reads this variable's value instead of the `plugins:iiop:buffer_pool:recycle_segments` variable's value.

buffer_pool:segment_preallocation

(Java only) When this variable is set, the `iiop_tls` plug-in reads this variable's value instead of the `plugins:iiop:buffer_pool:segment_preallocation` variable's value.

buffer_pools:max_incoming_buffers_in_pool

(C++ only) When this variable is set, the `iiop_tls` plug-in reads this variable's value instead of the `plugins:iiop:buffer_pools:max_incoming_buffers_in_pool` variable's value.

buffer_pools:max_outgoing_buffers_in_pool

(C++ only) When this variable is set, the `iiop_tls` plug-in reads this variable's value instead of the `plugins:iiop:buffer_pools:max_outgoing_buffers_in_pool` variable's value.

delay_credential_gathering_until_handshake

(Windows and Schannel only) This client configuration variable provides an alternative to using the `principal_sponsor` variables to specify an application's own certificate. When this variable is set to `true` and `principal_sponsor:use_principal_sponsor` is set to `false`, the client delays sending its certificate to a server. The client will wait until the server *explicitly* requests the client to send its credentials during the SSL/TLS handshake.

This configuration variable can be used in conjunction with the `plugins:schannel:prompt_with_credential_choice` configuration variable.

enable_iiop_1_0_client_support

This variable enables client-side interoperability of Artix SSL/TLS applications with legacy IIOP 1.0 SSL/TLS servers, which do not support IIOP 1.1.

The default value is `false`. When set to `true`, Artix SSL/TLS searches secure target IIOP 1.0 object references for legacy IIOP 1.0 SSL/TLS tagged component data, and attempts to connect on the specified port.

Note: This variable will not be necessary for most users.

incoming_connections:hard_limit

Specifies the maximum number of incoming (server-side) connections permitted to IIOP. IIOP does not accept new connections above this limit. Defaults to -1 (disabled).

When this variable is set, the `iiop_tls` plug-in reads this variable's value instead of the `plugins:iiop:incoming_connections:hard_limit` variable's value.

Please see the chapter on ACM in the *CORBA Programmer's Guide* for further details.

incoming_connections:soft_limit

Specifies the number of connections at which IIOP should begin closing incoming (server-side) connections. Defaults to -1 (disabled).

When this variable is set, the `iiop_tls` plug-in reads this variable's value instead of the `plugins:iiop:incoming_connections:soft_limit` variable's value.

Please see the chapter on ACM in the *CORBA Programmer's Guide* for further details.

outgoing_connections:hard_limit

When this variable is set, the `iiop_tls` plug-in reads this variable's value instead of the `plugins:iiop:outgoing_connections:hard_limit` variable's value.

outgoing_connections:soft_limit

When this variable is set, the `iiop_tls` plug-in reads this variable's value instead of the `plugins:iiop:outgoing_connections:soft_limit` variable's value.

tcp_listener:reincarnate_attempts

(Windows only)

`plugins:iiop_tls:tcp_listener:reincarnate_attempts` specifies the number of times that a Listener recreates its listener socket after recieving a SocketException.

Sometimes a network error may occur, which results in a listening socket being closed. On Windows, you can configure the listener to attempt a reincarnation, which enables new connections to be established. This variable only affects Java and C++ applications on Windows. Defaults to 0 (no attempts).

tcp_listener:reincarnation_retry_backoff_ratio

(Windows only)
`plugins:iiop_tls:tcp_listener:reincarnation_retry_delay` specifies a delay between reincarnation attempts. Data type is `long`. Defaults to `0` (no delay).

tcp_listener:reincarnation_retry_delay

(Windows only)
`plugins:iiop_tls:tcp_listener:reincarnation_retry_backoff_ratio`specifies the degree to which delays between retries increase from one retry to the next. Datatype is `long`. Defaults to `1`.

plugins:login_client

The `plugins:login_client` namespace contains the following variables:

- wsdl_url

wsdl_url

Specifies the location of the login service WSDL to the `login_client` plug-in. The value of this variable can either be a relative pathname or an URL. The `login_client` requires access to the login service WSDL in order to obtain details of the physical contract (for example, host and IP port).

plugins:login_service

The `plugins:login_service` namespace contains the following variables:

- wsdl_url

wsdl_url

Specifies the location of the login service WSDL to the `login_service` plug-in. The value of this variable can either be a relative pathname or an URL. The `login_service` requires access to the login service WSDL in order to obtain details of the physical contract (for example, host and IP port).

plugins:security

The `plugins:security` namespace contains the following variable:

- share_credentials_across_orbs

share_credentials_across_orbs

Enables own security credentials to be shared across ORBs. Normally, when you specify an own SSL/TLS credential (using the principal sponsor or the principal authenticator), the credential is available only to the ORB that created it. By setting the `plugins:security:share_credentials_across_orbs` variable to `true`, however, the own SSL/TLS credentials created by one ORB are automatically made available to any other ORBs that are configured to share credentials.

See also `principal_sponsor:csi:use_existing_credentials` for details of how to enable sharing of CSI credentials.

Default is `false`.

policies

The `policies` namespace defines the default CORBA policies for an ORB. Many of these policies can also be set programmatically from within an application. SSL/TLS-specific variables in the `policies` namespace include:

- `allow_unauthenticated_clients_policy`
- `certificate_constraints_policy`
- `client_secure_invocation_policy:requires`
- `client_secure_invocation_policy:supports`
- `max_chain_length_policy`
- `mechanism_policy:accept_v2_hellos`
- `mechanism_policy:ciphersuites`
- `mechanism_policy:protocol_version`
- `target_secure_invocation_policy:requires`
- `target_secure_invocation_policy:supports`
- `trusted_ca_list_policy`

allow_unauthenticated_clients_policy

(Deprecated in favor of `policies:iiop_tls:allow_unauthenticated_clients_policy` and `policies:https:allow_unauthenticated_clients_policy`.)

A generic variable that sets this policy both for `iiop_tls` and `https`. The recommended alternative is to use the variables prefixed by `policies:iiop_tls` and `policies:https` instead, which take precedence over this generic variable.

certificate_constraints_policy

(Deprecated in favor of `policies:iiop_tls:certificate_constraints_policy` and `policies:https:certificate_constraints_policy`.)

A generic variable that sets this policy both for `iiop_tls` and `https`. The recommended alternative is to use the variables prefixed by `policies:iiop_tls` and `policies:https` instead, which take precedence over this generic variable.

client_secure_invocation_policy:requires

(Deprecated in favor of `policies:iiop_tls:client_secure_invocation_policy:requires` and `policies:https:client_secure_invocation_policy:requires`.)

A generic variable that sets this policy both for `iiop_tls` and `https`. The recommended alternative is to use the variables prefixed by `policies:iiop_tls` and `policies:https` instead, which take precedence over this generic variable.

client_secure_invocation_policy:supports

(Deprecated in favor of `policies:iiop_tls:client_secure_invocation_policy:supports` and `policies:https:client_secure_invocation_policy:supports`.)

A generic variable that sets this policy both for `iiop_tls` and `https`. The recommended alternative is to use the variables prefixed by `policies:iiop_tls` and `policies:https` instead, which take precedence over this generic variable.

max_chain_length_policy

(Deprecated in favor of `policies:iiop_tls:max_chain_length_policy` and `policies:https:max_chain_length_policy`.)

`max_chain_length_policy` specifies the maximum certificate chain length that an ORB will accept. The policy can also be set programmatically using the `IT_TLS_API::MaxChainLengthPolicy` CORBA policy. Default is `2`.

Note: The `max_chain_length_policy` is not currently supported on the z/OS platform.

mechanism_policy:accept_v2_hellos

(Deprecated in favor of `policies:iiop_tls:mechanism_policy:accept_v2_hellos` and `policies:https:mechanism_policy:accept_v2_hellos`.)

The `accept_v2_hellos` policy is a special setting that facilitates interoperability with an Artix application deployed on the z/OS platform. When `true`, the Artix application accepts V2 client hellos, but continues the handshake using either the SSL_V3 or TLS_V1 protocol. When `false`, the Artix application throws an error, if it receives a V2 client hello. The default is `false`.

For example:

```
policies:mechanism_policy:accept_v2_hellos = "true";
```

mechanism_policy:ciphersuites

(Deprecated in favor of `policies:iiop_tls:mechanism_policy:ciphersuites` and `policies:https:mechanism_policy:ciphersuites`.)

`mechanism_policy:ciphersuites` specifies a list of cipher suites for the default mechanism policy. One or more of the cipher suites shown in Table 10 can be specified in this list.

Table 10: *Mechanism Policy Cipher Suites*

Null Encryption, Integrity and Authentication Ciphers	Standard Ciphers
RSA_WITH_NULL_MD5	RSA_EXPORT_WITH_RC4_40_MD5
RSA_WITH_NULL_SHA	RSA_WITH_RC4_128_MD5
	RSA_WITH_RC4_128_SHA
	RSA_EXPORT_WITH_DES40_CBC_SHA
	RSA_WITH_DES_CBC_SHA
	RSA_WITH_3DES_EDE_CBC_SHA

If you do not specify the list of cipher suites explicitly, all of the null encryption ciphers are disabled and all of the non-export strength ciphers are supported by default.

mechanism_policy:protocol_version

(Deprecated in favor of `policies:iiop_tls:mechanism_policy:protocol_version` and `policies:https:mechanism_policy:protocol_version`.)

`mechanism_policy:protocol_version` specifies the list of protocol versions used by a security capsule (ORB instance). The list can include one or more of the values `SSL_V3` and `TLS_V1`. For example:

```
policies:mechanism_policy:protocol_version=["TLS_V1", "SSL_V3"];
```

target_secure_invocation_policy:requires

(Deprecated in favor of `policies:iiop_tls:target_secure_invocation_policy:requires` and `policies:https:target_secure_invocation_policy:requires`.)

`target_secure_invocation_policy:requires` specifies the minimum level of security required by a server. The value of this variable is specified as a list of association options.

Note: In accordance with CORBA security, this policy cannot be downgraded programmatically by the application.

target_secure_invocation_policy:supports

(Deprecated in favor of `policies:iiop_tls:target_secure_invocation_policy:supports` and `policies:https:target_secure_invocation_policy:supports`.)

`supports` specifies the maximum level of security supported by a server. The value of this variable is specified as a list of association options. This policy can be upgraded programmatically using either the `QOP` or the `EstablishTrust` policies.

trusted_ca_list_policy

(Deprecated in favor of `policies:iiop_tls:trusted_ca_list_policy` and `policies:https:trusted_ca_list_policy`.)

`trusted_ca_list_policy` specifies a list of filenames, each of which contains a concatenated list of CA certificates in PEM format. The aggregate of the CAs in all of the listed files is the set of trusted CAs.

For example, you might specify two files containing CA lists as follows:

```
policies:trusted_ca_list_policy =
   ["install_dir/asp/version/etc/tls/x509/ca/ca_list1.pem",
   "install_dir/asp/version/etc/tls/x509/ca/ca_list_extra.pem"];
```

The purpose of having more than one file containing a CA list is for administrative convenience. It enables you to group CAs into different lists and to select a particular set of CAs for a security domain by choosing the appropriate CA lists.

policies:asp

The `policies:asp` namespace contains the following variables:

- enable_authorization
- enable_sso

enable_authorization

A boolean variable that specifies whether Artix should enable authorization using the Artix Security Framework. Default is `false`.

enable_sso

A boolean variable that specifies whether Artix enables single-sign on (SSO) on the server-side. Default is `false`.

policies:bindings:corba

The `policies:bindings:corba` namespace contains the following variables:

- token_propagation
- gssup_propagation

token_propagation

A boolean variable that can be used in a SOAP-to-CORBA router to enable the transfer of an SSO token from an incoming SOAP request into an outgoing CORBA request.

The CORBA binding extracts the SSO token from incoming SOAP/HTTP invocations and inserts the token into an outgoing IIOP request, to be transmitted using CSI identity assertion.

gssup_propagation

A boolean variable that can be used in a SOAP-to-CORBA router to enable the transfer of incoming SOAP credentials into outgoing CORBA credentials.

The CORBA binding extracts the username and password credentials from incoming SOAP/HTTP invocations and inserts them into an outgoing GSSUP credentials object, to be transmitted using CSI authentication over transport. The domain name in the outgoing GSSUP credentials is set to a blank string. Default is `false`.

policies:csi

The `policies:csi` namespace includes variables that specify settings for Common Secure Interoperability version 2 (CSIv2):

- `attribute_service:backward_trust:enabled`
- `attribute_service:client_supports`
- `attribute_service:target_supports`
- `auth_over_transport:authentication_service`
- `auth_over_transport:client_supports`
- `auth_over_transport:server_domain_name`
- `auth_over_transport:target_requires`
- `auth_over_transport:target_supports`

attribute_service:backward_trust:enabled

(Obsolete)

attribute_service:client_supports

`attribute_service:client_supports` is a client-side policy that specifies the association options supported by the CSIv2 attribute service (principal propagation). The only assocation option that can be specified is `IdentityAssertion`. This policy is normally specified in an intermediate server so that it propagates CSIv2 identity tokens to a target server. For example:

```
policies:csi:attribute_service:client_supports =
   ["IdentityAssertion"];
```

attribute_service:target_supports

`attribute_service:target_supports` is a server-side policy that specifies the association options supported by the CSIv2 attribute service (principal propagation). The only assocation option that can be specified is `IdentityAssertion`. For example:

```
policies:csi:attribute_service:target_supports =
   ["IdentityAssertion"];
```

auth_over_transport:authentication_service

(Java CSI plug-in only) The name of a Java class that implements the `IT_CSI::AuthenticateGSSUPCredentials` IDL interface. The authentication service is implemented as a callback object that plugs into the CSIv2 framework on the server side. By replacing this class with a custom implementation, you could potentially implement a new security technology domain for CSIv2.

By default, if no value for this variable is specified, the Java CSI plug-in uses a default authentication object that always returns `false` when the `authenticate()` operation is called.

auth_over_transport:client_supports

`auth_over_transport:client_supports` is a client-side policy that specifies the association options supported by CSIv2 authorization over transport. The only assocation option that can be specified is `EstablishTrustInClient`. For example:

```
policies:csi:auth_over_transport:client_supports =
   ["EstablishTrustInClient"];
```

auth_over_transport:server_domain_name

The iSF security domain (CSIv2 authentication domain) to which this server application belongs. The iSF security domains are administered within an overall security technology domain.

The value of the `server_domain_name` variable will be embedded in the IORs generated by the server. A CSIv2 client about to open a connection to this server would check that the domain name in its own CSIv2 credentials matches the domain name embedded in the IOR.

auth_over_transport:target_requires

`auth_over_transport:target_requires` is a server-side policy that specifies the association options required for CSIv2 authorization over transport. The only assocation option that can be specified is `EstablishTrustInClient`. For example:

```
policies:csi:auth_over_transport:target_requires =
   ["EstablishTrustInClient"];
```

auth_over_transport:target_supports

`auth_over_transport:target_supports` is a server-side policy that specifies the association options supported by CSIv2 authorization over transport. The only assocation option that can be specified is `EstablishTrustInClient`. For example:

```
policies:csi:auth_over_transport:target_supports =
   ["EstablishTrustInClient"];
```

policies:https

The `policies:https` namespace contains variables used to configure the https plugin. It contains the following variables:

- `allow_unauthenticated_clients_policy`
- `certificate_constraints_policy`
- `client_secure_invocation_policy:requires`
- `client_secure_invocation_policy:supports`
- `max_chain_length_policy`
- `mechanism_policy:accept_v2_hellos`
- `mechanism_policy:ciphersuites`
- `mechanism_policy:protocol_version`
- `session_caching_policy`
- `target_secure_invocation_policy:requires`
- `target_secure_invocation_policy:supports`
- `trusted_ca_list_policy`

allow_unauthenticated_clients_policy

A boolean variable that specifies whether a server will allow a client to establish a secure connection without sending a certificate. Default is `false`.

This configuration variable is applicable *only* in the special case where the target secure invocation policy is set to require `NoProtection` (a semi-secure server).

certificate_constraints_policy

A list of constraints applied to peer certificates—see "Applying Constraints to Certificates" on page 159 for the syntax of the pattern constraint language. If a peer certificate fails to match any of the constraints, the certificate validation step will fail.

The policy can also be set programmatically using the `IT_TLS_API::CertConstraintsPolicy` CORBA policy. Default is no constraints.

client_secure_invocation_policy:requires

Specifies the minimum level of security required by a client. The value of this variable is specified as a list of association options—see the *Orbix Security Guide* for details on how to set SSL/TLS association options.

Note: In accordance with CORBA security, this policy cannot be downgraded programmatically by the application.

client_secure_invocation_policy:supports

Specifies the initial maximum level of security supported by a client. The value of this variable is specified as a list of association options—see the *Orbix Security Guide* for details on how to set SSL/TLS association options.

Note: This policy can be upgraded programmatically using either the `QOP` or the `EstablishTrust` policies.

max_chain_length_policy

The maximum certificate chain length that an ORB will accept (see the discussion of certificate chaining in the *Orbix Security Guide*).

The policy can also be set programmatically using the `IT_TLS_API::MaxChainLengthPolicy` CORBA policy. Default is `2`.

Note: The `max_chain_length_policy` is not currently supported on the z/OS platform.

mechanism_policy:accept_v2_hellos

This HTTPS-specific policy overides the generic `policies:mechanism_policy:accept_v2_hellos` policy.

The accept_v2_hellos policy is a special setting that facilitates HTTPS interoperability with certain Web browsers. Many Web browsers send SSL V2 client hellos, because they do not know what SSL version the server supports.

When true, the Artix server accepts V2 client hellos, but continues the handshake using either the SSL_V3 or TLS_V1 protocol. When false, the Artix server throws an error, if it receives a V2 client hello. The default is true.

Note: This default value is deliberately different from the policies:iiop_tls:mechanism_policy:accept_v2_hellos default value.

For example:

```
policies:https:mechanism_policy:accept_v2_hellos = "true";
```

mechanism_policy:ciphersuites

Specifies a list of cipher suites for the default mechanism policy. One or more of the following cipher suites can be specified in this list:

Table 11: *Mechanism Policy Cipher Suites*

Null Encryption, Integrity and Authentication Ciphers	Standard Ciphers
RSA_WITH_NULL_MD5	RSA_EXPORT_WITH_RC4_40_MD5
RSA_WITH_NULL_SHA	RSA_WITH_RC4_128_MD5
	RSA_WITH_RC4_128_SHA
	RSA_EXPORT_WITH_DES40_CBC_SHA
	RSA_WITH_DES_CBC_SHA
	RSA_WITH_3DES_EDE_CBC_SHA

If you do not specify the list of cipher suites explicitly, all of the null encryption ciphers are disabled and all of the non-export strength ciphers are supported by default.

mechanism_policy:protocol_version

This HTTPS-specific policy overides the generic `policies:mechanism_policy:protocol_version` policy.

Specifies the list of protocol versions used by a security capsule (ORB instance). Can include one or more of the following values:

`TLS_V1`
`SSL_V3`

The default setting is `SSL_V3` and `TLS_V1`.

For example:

```
policies:https:mechanism_policy:protocol_version = ["TLS_V1",
   "SSL_V3"];
```

session_caching_policy

When this policy is set, the `https` plug-in reads this policy's value instead of the `policies:session_caching` policy's value (C++) or `policies:session_caching_policy` policy's value (Java).

target_secure_invocation_policy:requires

Specifies the minimum level of security required by a server. The value of this variable is specified as a list of association options—see the *Orbix Security Guide* for more details about association options.

In accordance with CORBA security, this policy cannot be downgraded programmatically by the application.

target_secure_invocation_policy:supports

Specifies the maximum level of security supported by a server. The value of this variable is specified as a list of association options—see the *Orbix Security Guide* for more details about association options.

This policy can be upgraded programmatically using either the `QOP` or the `EstablishTrust` policies.

trusted_ca_list_policy

Contains a list of filenames (or a single filename), each of which contains a concatenated list of CA certificates in PEM format. The aggregate of the CAs in all of the listed files is the set of trusted CAs.

For example, you might specify two files containing CA lists as follows:

```
policies:trusted_ca_list_policy =
   ["ASPInstallDir/asp/6.0/etc/tls/x509/ca/ca_list1.pem",
   "ASPInstallDir/asp/6.0/etc/tls/x509/ca/ca_list_extra.pem"];
```

The purpose of having more than one file containing a CA list is for administrative convenience. It enables you to group CAs into different lists and to select a particular set of CAs for a security domain by choosing the appropriate CA lists.

policies:iiop_tls

The `policies:iiop_tls` namespace contains variables used to set IIOP-related policies for a secure environment. These setting affect the `iiop_tls` plugin. It contains the following variables:

- `allow_unauthenticated_clients_policy`
- `buffer_sizes_policy:default_buffer_size`
- `buffer_sizes_policy:max_buffer_size`
- `certificate_constraints_policy`
- `client_secure_invocation_policy:requires`
- `client_secure_invocation_policy:supports`
- `client_version_policy`
- `connection_attempts`
- `connection_retry_delay`
- `load_balancing_mechanism`
- `max_chain_length_policy`
- `mechanism_policy:accept_v2_hellos`
- `mechanism_policy:ciphersuites`
- `mechanism_policy:protocol_version`
- `server_address_mode_policy:local_domain`
- `server_address_mode_policy:local_hostname`
- `server_address_mode_policy:port_range`
- `server_address_mode_policy:publish_hostname`
- `server_version_policy`
- `target_secure_invocation_policy:requires`
- `target_secure_invocation_policy:supports`
- `tcp_options_policy:no_delay`
- `tcp_options_policy:recv_buffer_size`
- `tcp_options_policy:send_buffer_size`
- `trusted_ca_list_policy`

allow_unauthenticated_clients_policy

A boolean variable that specifies whether a server will allow a client to establish a secure connection without sending a certificate. Default is `false`.

This configuration variable is applicable *only* in the special case where the target secure invocation policy is set to require `NoProtection` (a semi-secure server).

buffer_sizes_policy:default_buffer_size

When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:buffer_sizes_policy:default_buffer_size` policy's value.

`buffer_sizes_policy:default_buffer_size` specifies, in bytes, the initial size of the buffers allocated by IIOP. Defaults to 16000. This value must be greater than 80 bytes, and must be evenly divisible by 8.

buffer_sizes_policy:max_buffer_size

When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:buffer_sizes_policy:max_buffer_size` policy's value.

`buffer_sizes_policy:max_buffer_size` specifies the maximum buffer size permitted by IIOP, in kilobytes. Defaults to 512. A value of -1 indicates unlimited size. If not unlimited, this value must be greater than 80.

certificate_constraints_policy

A list of constraints applied to peer certificates—see the discussion of certificate constraints in the Artix security guide for the syntax of the pattern constraint language. If a peer certificate fails to match any of the constraints, the certificate validation step will fail.

The policy can also be set programmatically using the `IT_TLS_API::CertConstraintsPolicy` CORBA policy. Default is no constraints.

client_secure_invocation_policy:requires

Specifies the minimum level of security required by a client. The value of this variable is specified as a list of association options—see the *Artix Security Guide* for more details about association options.

In accordance with CORBA security, this policy cannot be downgraded programmatically by the application.

client_secure_invocation_policy:supports

Specifies the initial maximum level of security supported by a client. The value of this variable is specified as a list of association options—see the *Artix Security Guide* for more details about association options.

This policy can be upgraded programmatically using either the `QOP` or the `EstablishTrust` policies.

client_version_policy

`client_version_policy` specifies the highest IIOP version used by clients. A client uses the version of IIOP specified by this variable, or the version specified in the IOR profile, whichever is lower. Valid values for this variable are: `1.0`, `1.1`, and `1.2`.

For example, the following file-based configuration entry sets the server IIOP version to `1.1`.

```
policies:iiop:server_version_policy="1.1";
```

The following `itadmin` command set this variable:

```
itadmin variable modify -type string -value "1.1"
   policies:iiop:server_version_policy
```

connection_attempts

`connection_attempts` specifies the number of connection attempts used when creating a connected socket using a Java application. Defaults to `5`.

connection_retry_delay

`connection_retry_delay` specifies the delay, in seconds, between connection attempts when using a Java application. Defaults to `2`.

load_balancing_mechanism

Specifies the load balancing mechanism for the client of a security service cluster (see also `plugins:gsp:use_client_load_balancing`). In this context, a client can also be an *Artix* server. This policy only affects connections made using IORs that contain multiple addresses. The `iiop_tls` plug-in load balances over the addresses embedded in the IOR.

The following mechanisms are supported:

- `random`—choose one of the addresses embedded in the IOR at random (this is the default).
- `sequential`—choose the first address embedded in the IOR, moving on to the next address in the list only if the previous address could not be reached.

max_chain_length_policy

This policy overides `policies:max_chain_length_policy` for the `iiop_tls` plugin.

The maximum certificate chain length that an ORB will accept.

The policy can also be set programmatically using the `IT_TLS_API::MaxChainLengthPolicy` CORBA policy. Default is `2`.

Note: The `max_chain_length_policy` is not currently supported on the z/OS platform.

mechanism_policy:accept_v2_hellos

This IIOP/TLS-specific policy overides the generic `policies:mechanism_policy:accept_v2_hellos` policy.

The accept_v2_hellos policy is a special setting that facilitates interoperability with an Artix application deployed on the z/OS platform. Artix security on the z/OS platform is based on IBM's System/SSL toolkit, which implements SSL version 3, but does so by using SSL version 2 hellos as part of the handshake. This form of handshake causes interoperability problems, because applications on other platforms identify the handshake as an SSL version 2 handshake. The misidentification of the SSL protocol version can be avoided by setting the accept_v2_hellos policy to true in the non-z/OS application (this bug also affects some old versions of Microsoft Internet Explorer).

When true, the Artix application accepts V2 client hellos, but continues the handshake using either the SSL_V3 or TLS_V1 protocol. When false, the Artix application throws an error, if it receives a V2 client hello. The default is false.

Note: This default value is deliberately different from the policies:https:mechanism_policy:accept_v2_hellos default value.

For example:

```
policies:iiop_tls:mechanism_policy:accept_v2_hellos = "true";
```

mechanism_policy:ciphersuites

This policy overides policies:mechanism_policy:ciphersuites for the iiop_tls plugin.

Specifies a list of cipher suites for the default mechanism policy. One or more of the following cipher suites can be specified in this list:

Table 12: *Mechanism Policy Cipher Suites*

Null Encryption, Integrity and Authentication Ciphers	Standard Ciphers
RSA_WITH_NULL_MD5	RSA_EXPORT_WITH_RC4_40_MD5
RSA_WITH_NULL_SHA	RSA_WITH_RC4_128_MD5
	RSA_WITH_RC4_128_SHA
	RSA_EXPORT_WITH_DES40_CBC_SHA

Table 12: *Mechanism Policy Cipher Suites*

Null Encryption, Integrity and Authentication Ciphers	Standard Ciphers
	RSA_WITH_DES_CBC_SHA
	RSA_WITH_3DES_EDE_CBC_SHA

If you do not specify the list of cipher suites explicitly, all of the null encryption ciphers are disabled and all of the non-export strength ciphers are supported by default.

mechanism_policy:protocol_version

This IIOP/TLS-specific policy overides the generic `policies:mechanism_policy:protocol_version` policy.

Specifies the list of protocol versions used by a security capsule (ORB instance). Can include one or more of the following values:

`TLS_V1`
`SSL_V3`
`SSL_V2V3` *(Deprecated)*

The default setting is `SSL_V3` and `TLS_V1`.

For example:

```
policies:iiop_tls:mechanism_policy:protocol_version = ["TLS_V1",
   "SSL_V3"];
```

The `SSL_V2V3` value is now *deprecated*. It was previously used to facilitate interoperability with Artix applications deployed on the z/OS platform. If you have any legacy configuration that uses `SSL_V2V3`, you should replace it with the following combination of settings:

```
policies:iiop_tls:mechanism_policy:protocol_version = ["SSL_V3",
   "TLS_V1"];
policies:iiop_tls:mechanism_policy:accept_v2_hellos = "true";
```

server_address_mode_policy:local_domain

(Java only) When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:server_address_mode_policy:local_domain` policy's value.

server_address_mode_policy:local_hostname

(Java only) When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:server_address_mode_policy:local_hostname` policy's value.

`server_address_mode_policy:local_hostname` specifies the hostname advertised by the locator daemon, and listened on by server-side IIOP.

Some machines have multiple hostnames or IP addresses (for example, those using multiple DNS aliases or multiple network cards). These machines are often termed *multi-homed hosts*. The `local_hostname` variable supports these type of machines by enabling you to explicitly specify the host that servers listen on and publish in their IORs.

For example, if you have a machine with two network addresses (`207.45.52.34` and `207.45.52.35`), you can explicitly set this variable to either address:

```
policies:iiop:server_address_mode_policy:local_hostname =
   "207.45.52.34";
```

By default, the `local_hostname` variable is unspecified. Servers use the default hostname configured for the machine with the Orbix configuration tool.

server_address_mode_policy:port_range

(Java only) When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:server_address_mode_policy:port_range` policy's value.

`server_address_mode_policy:port_range` specifies the range of ports that a server uses when there is no well-known addressing policy specified for the port.

server_address_mode_policy:publish_hostname

When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:server_address_mode_policy:publish_hostname` policy's value.

`server_address_mode-policy:publish_hostname` specifes whether IIOP exports hostnames or IP addresses in published profiles. Defaults to `false` (exports IP addresses, and does not export hostnames). To use hostnames in object references, set this variable to `true`, as in the following file-based configuration entry:

```
policies:iiop:server_address_mode_policy:publish_hostname=true
```

The following `itadmin` command is equivalent:

```
itadmin variable create -type bool -value true
   policies:iiop:server_address_mode_policy:publish_hostname
```

server_version_policy

When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:server_version_policy` policy's value.

`server_version_policy` specifies the GIOP version published in IIOP profiles. This variable takes a value of either `1.1` or `1.2`. Orbix servers do not publish IIOP 1.0 profiles. The default value is `1.2`.

target_secure_invocation_policy:requires

This policy overides `policies:target_secure_invocation_policy:requires` for the `iiop_tls` plugin.

Specifies the minimum level of security required by a server. The value of this variable is specified as a list of association options—see the *Artix Security Guide* for more details about association options.

In accordance with CORBA security, this policy cannot be downgraded programmatically by the application.

target_secure_invocation_policy:supports

This policy overides `policies:target_secure_invocation_policy:supports` for the `iiop_tls` plugin.

Specifies the maximum level of security supported by a server. The value of this variable is specified as a list of association options—see the *Artix Security Guide* for more details about association options.

This policy can be upgraded programmatically using either the `QOP` or the `EstablishTrust` policies.

tcp_options_policy:no_delay

When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:tcp_options_policy:no_delay` policy's value.

`tcp_options_policy:no_delay` specifies whether the `TCP_NODELAY` option should be set on connections. Defaults to `false`.

tcp_options_policy:recv_buffer_size

When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:tcp_options_policy:recv_buffer_size` policy's value.

`tcp_options_policy:recv_buffer_size` specifies the size of the TCP receive buffer. This variable can only be set to `0`, which coresponds to using the default size defined by the operating system.

tcp_options_policy:send_buffer_size

When this policy is set, the `iiop_tls` plug-in reads this policy's value instead of the `policies:iiop:tcp_options_policy:send_buffer_size` policy's value.

`tcp_options_policy:send_buffer_size` specifies the size of the TCP send buffer. This variable can only be set to `0`, which coresponds to using the default size defined by the operating system.

trusted_ca_list_policy

This policy overides the `policies:trusted_ca_list_policy` for the `iiop_tls` plugin.

Contains a list of filenames (or a single filename), each of which contains a concatenated list of CA certificates in PEM format. The aggregate of the CAs in all of the listed files is the set of trusted CAs.

For example, you might specify two files containing CA lists as follows:

```
policies:trusted_ca_list_policy =
   ["ASPInstallDir/asp/6.0/etc/tls/x509/ca/ca_list1.pem",
   "ASPInstallDir/asp/6.0/etc/tls/x509/ca/ca_list_extra.pem"];
```

The purpose of having more than one file containing a CA list is for administrative convenience. It enables you to group CAs into different lists and to select a particular set of CAs for a security domain by choosing the appropriate CA lists.

principal_sponsor

The `principal_sponsor` namespace stores configuration information to be used when obtaining credentials. the CORBA binding provides an implementation of a principal sponsor that creates credentials for applications automatically.

Use of the `PrincipalSponsor` is disabled by default and can only be enabled through configuration.

The `PrincipalSponsor` represents an entry point into the secure system. It must be activated and authenticate the user, before any application-specific logic executes. This allows unmodified, security-unaware applications to have `Credentials` established transparently, prior to making invocations.

In this section

The following variables are in this namespace:

- `use_principal_sponsor`
- `auth_method_id`
- `auth_method_data`
- `callback_handler:ClassName`
- `login_attempts`

use_principal_sponsor

`use_principal_sponsor` specifies whether an attempt is made to obtain credentials automatically. Defaults to `false`. If set to `true`, the following `principal_sponsor` variables must contain data in order for anything to actually happen.

auth_method_id

`auth_method_id` specifies the authentication method to be used. The following authentication methods are available:

`pkcs12_file` The authentication method uses a PKCS#12 file.

For example, you can select the `pkcs12_file` authentication method as follows:

```
principal_sponsor:auth_method_id = "pkcs12_file";
```

auth_method_data

`auth_method_data` is a string array containing information to be interpreted by the authentication method represented by the `auth_method_id`.

For the `pkcs12_file` authentication method, the following authentication data can be provided in `auth_method_data`:

`filename` A PKCS#12 file that contains a certificate chain and private key—*required*.

`password` A password for the private key—*optional*.

It is bad practice to supply the password from configuration for deployed systems. If the password is not supplied, the user is prompted for it.

`password_file` The name of a file containing the password for the private key—*optional*.

This option is not recommended for deployed systems.

For example, to configure an application on Windows to use a certificate, `bob.p12`, whose private key is encrypted with the `bobpass` password, set the `auth_method_data` as follows:

```
principal_sponsor:auth_method_data =
   ["filename=c:\users\bob\bob.p12", "password=bobpass"];
```

The following points apply to Java implementations:

- If the file specified by `filename=` is not found, it is searched for on the classpath.

- The file specified by `filename=` can be supplied with a URL instead of an absolute file location.
- The mechanism for prompting for the password if the password is supplied through `password=` can be replaced with a custom mechanism, as demonstrated by the `login` demo.

- There are two extra configuration variables available as part of the `principal_sponsor` namespace, namely `principal_sponsor:callback_handler` and `principal_sponsor:login_attempts`. These are described below.
- These Java-specific features are available subject to change in future releases; any changes that can arise probably come from customer feedback on this area.

callback_handler:ClassName

`callback_handler:ClassName` specifies the class name of an interface that implements the interface `com.iona.corba.tls.auth.CallbackHandler`. This variable is only used for Java clients.

login_attempts

`login_attempts` specifies how many times a user is prompted for authentication data (usually a password). It applies for both internal and custom `CallbackHandlers`; if a `CallbackHandler` is supplied, it is invoked upon up to `login_attempts` times as long as the `PrincipalAuthenticator` returns `SecAuthFailure`. This variable is only used by Java clients.

principal_sponsor:csi

The `principal_sponsor:csi` namespace stores configuration information to be used when obtaining CSI (Common Secure Interoperability) credentials. It includes the following:

- `use_existing_credentials`
- `use_principal_sponsor`
- `auth_method_data`
- `auth_method_id`

use_existing_credentials

A boolean value that specifies whether ORBs that share credentials can also share CSI credentials. If `true`, any CSI credentials loaded by one credential-sharing ORB can be used by other credential-sharing ORBs loaded after it; if `false`, CSI credentials are not shared.

This variable has no effect, unless the `plugins:security:share_credentials_across_orbs` variable is also `true`.

Default is `false`.

use_principal_sponsor

`use_principal_sponsor` is a boolean value that switches the CSI principal sponsor on or off.

If set to `true`, the CSI principal sponsor is enabled; if `false`, the CSI principal sponsor is disabled and the remaining `principal_sponsor:csi` variables are ignored. Defaults to `false`.

auth_method_data

auth_method_data is a string array containing information to be interpreted by the authentication method represented by the auth_method_id.

For the GSSUPMech authentication method, the following authentication data can be provided in auth_method_data:

username	The username for CSIv2 authorization. This is optional. Authentication of CSIv2 usernames and passwords is performed on the server side. The administration of usernames depends on the particular security mechanism that is plugged into the server side see auth_over_transport:authentication_service.
password	The password associated with username. This is optional. It is bad practice to supply the password from configuration for deployed systems. If the password is not supplied, the user is prompted for it.
domain	The CSIv2 authentication domain in which the username/password pair is authenticated. When the client is about to open a new connection, this domain name is compared with the domain name embedded in the relevant IOR (see policies:csi:auth_over_transport:server_domain_name). The domain names must match. **Note:** If domain is an empty string, it matches any target domain. That is, an empty domain string is equivalent to a wildcard.

If any of the preceding data are omitted, the user is prompted to enter authentication data when the application starts up.

For example, to log on to a CSIv2 application as the administrator user in the US-SantaClara domain:

```
principal_sponsor:csi:auth_method_data =
   ["username=administrator", "domain=US-SantaClara"];
```

When the application is started, the user is prompted for the administrator password.

Note: It is currently not possible to customize the login prompt associated with the CSIv2 principal sponsor. As an alternative, you could implement your own login GUI by programming and pass the user input directly to the principal authenticator.

auth_method_id

`auth_method_id` specifies a string that selects the authentication method to be used by the CSI application. The following authentication method is available:

`GSSUPMech`	The Generic Security Service Username/Password (GSSUP) mechanism.

For example, you can select the GSSUPMech authentication method as follows:

```
principal_sponsor:csi:auth_method_id = "GSSUPMech";
```

principal_sponsor:https

The `principal_sponsor:https` namespace provides configuration variables that enable you to specify the *own credentials* used with the HTTPS transport. The variables in the `principal_sponsor:https` namespace (which are specific to the HTTPS protocol) have precedence over the analogous variables in the `principal_sponsor` namespace.

Use of the `PrincipalSponsor` is disabled by default and can only be enabled through configuration.

The `PrincipalSponsor` represents an entry point into the secure system. It must be activated and authenticate the user, before any application-specific logic executes. This allows unmodified, security-unaware applications to have `Credentials` established transparently, prior to making invocations.

In this section

The following variables are in this namespace:

use_principal_sponsor

`use_principal_sponsor` specifies whether an attempt is made to obtain credentials automatically. Defaults to `false`. If set to `true`, the following `principal_sponsor:https` variables must contain data in order for anything to actually happen:

- `auth_method_id`
- `auth_method_data`

auth_method_id

`auth_method_id` specifies the authentication method to be used. The following authentication methods are available:

`pkcs12_file`	The authentication method uses a PKCS#12 file

For example, you can select the `pkcs12_file` authentication method as follows:

```
principal_sponsor:auth_method_id = "pkcs12_file";
```

auth_method_data

`auth_method_data` is a string array containing information to be interpreted by the authentication method represented by the `auth_method_id`.

For the `pkcs12_file` authentication method, the following authentication data can be provided in `auth_method_data`:

`filename`	A PKCS#12 file that contains a certificate chain and private key—*required*.
`password`	A password for the private key—*optional*. It is bad practice to supply the password from configuration for deployed systems. If the password is not supplied, the user is prompted for it.
`password_file`	The name of a file containing the password for the private key—*optional*. This option is not recommended for deployed systems.

For example, to configure an application on Windows to use a certificate, `bob.p12`, whose private key is encrypted with the `bobpass` password, set the `auth_method_data` as follows:

```
principal_sponsor:auth_method_data =
   ["filename=c:\users\bob\bob.p12", "password=bobpass"];
```

CHAPTER 8

CORBA

When using the CORBA transport, Artix behaves like an Orbix C++ application. This means that you can specify the Orbix configuration variables that apply to the CORBA-based plug-ins used by Artix.

Note: The variables described in this chapter only apply when Artix is using the CORBA transport.

In this chapter

The following CORBA-based variables are discussed in this chapter:

plugins:codeset

The variables in this namespace specify the codesets used by the CORBA portion of Artix. This is useful when internationalizing your environment. This namespace includes the following variables:

- char:ncs
- char:ccs
- wchar:ncs
- wchar:ccs
- always_use_default

char:ncs

char:ncs specifies the native codeset to use for narrow characters. The default setting is determined as follows:

Table 13: *Defaults for the native narrow codeset*

Platform/Locale	Language	Setting
non-MVS, Latin-1 locale	C++	ISO-8859-1
MVS	C++	EBCDIC
ISO-8859-1/Cp-1292/US-ASCII locale	Java	ISO-8859-1
Shift_JS locale	Java	UTF-8
EUC-JP locale	Java	UTF-8
other	Java	UTF-8

char:ccs

char:ccs specifies the list of conversion codesets supported for narrow characters. The default setting is determined as follows:

Table 14: *Defaults for the narrow conversion codesets*

Platform/Locale	Language	Setting
non-MVS, Latin-1 locale	C++	
MVS	C++	IOS-8859-1
ISO-8859-1/Cp-1292/US-ASCII locale	Java	UTF-8
Shift_JIS locale	Java	Shift_JIS, euc_JP, ISO-8859-1
EUC-JP locale	Java	euc_JP, Shift_JIS, ISO-8859-1
other	Java	file encoding, ISO-8859-1

wchar:ncs

wchar:ncs specifies the native codesets supported for wide characters. The default setting is determined as follows:

Table 15: *Defaults for the wide native codesets*

Platform/Locale	Language	Setting
non-MVS, Latin-1 locale	C++	UCS-2, UCS-4
MVS	C++	UCS-2, UCS-4
ISO-8859-1/Cp-1292/US-ASCII locale	Java	UTF-16
Shift_JIS locale	Java	UTF-16

Table 15: *Defaults for the wide native codesets*

Platform/Locale	Language	Setting
EUC-JP locale	Java	UTF-16
other	Java	UTF-16

wchar:ccs

`wchar:ccs` specifies the list of conversion codesets supported for wide characters. The default setting is determined as follows:

Table 16: *Defaults for the narrow conversion codesets*

Platform/Locale	Language	Setting
non-MVS, Latin-1 locale	C++	UTF-16
MVS	C++	UTF-16
ISO-8859-1/Cp-1292/US-ASCII locale	Java	UCS-2
Shift_JIS locale	Java	UCS-2, Shift_JIS,euc_JP
EUC-JP locale	Java	UCS-2, euc_JP, Shift_JIS
other	Java	file encoding, UCS-2

always_use_default

`always_use_default` specifies that hardcoded default values will be used and any `codeset` variables will be ignored if they are in the same configuration scope or higher.

plugins:giop

This namespace contains the `plugins:giop:message_server_binding_list` configuration variable, which is one of the variables used to configure bidirectional GIOP. This feature allows callbacks to be made using a connection opened by the client, instead of requiring the server to open a new connection for the callback.

message_server_binding_list

`plugins:giop:message_server_binding_list` specifies a list message inceptors that are used for bidirectional GIOP. On the client-side, the `plugins:giop:message_server_binding_list` must be configured to indicate that an existing outgoing message interceptor chain may be re-used for an incoming server binding, similarly by including an entry for `BiDir_GIOP`, for example:

```
plugins:giop:message_server_binding_list=["BiDir_GIOP","GIOP" ];
```

Further information

For details of all the steps involved in setting bidirectional GIOP, see the *Orbix Administrator's Guide*.

plugins:giop_snoop

The variables in this namespace configure settings for the GIOP Snoop tool. This tool intercepts and displays GIOP message content. Its primary roles are as a protocol-level monitor and a debug aid.

The GIOP Snoop plug-in implements message-level interceptors that can participate in client and/or server side bindings over any GIOP-based transport.

The variables in the giop_snoop namespace include the following:

- filename
- rolling_file
- shlib_name
- verbosity

filename

plugins:giop_snoop:filename specifies a file for GIOP Snoop output. By default, output is directed to standard error (stderr). This variable has the following format:

```
plugins:giop_snoop:filename = "<some-file-path>";
```

A *month/day/year* time stamp is included in the output filename with the following general format:

```
<filename>.MMDDYYYY
```

rolling_file

plugins:giop_snoop:rolling_file prevents the GIOP Snoop output file from growing indefinitely. This setting specifies to open and then close the output file for each snoop message trace, instead of holding the output files open. This enables administrators to control the size and content of output files. This setting is enabled with:

```
plugins:giop_snoop:rolling_file = "true";
```

shlib_name

(C++ only) `plugins:giop_snoop:shlib_name` locates and loads the `giop_snoop` plug-in. This is configured by default as follows:

```
plugins:giop_snoop:shlib_name = "it_giop_snoop";
```

Note: In addition, for both client or server configuration, the `giop_snoop` plug-in must be included in your `orb_plugins` list.

verbosity

`plugins:giop_snoop:verbosity` is used to control the verbosity levels of the GIOP Snoop output. For example:

```
plugins:giop_snoop:verbosity = "1";
```

GIOP Snoop verbosity levels are as follows:

```
1      LOW
2      MEDIUM
3      HIGH
4      VERY HIGH
```

plugins:iiop

The variables in this namespace configure active connection management, IIOP buffer management. For more information about active connection management, see the *Orbix Administrator's Guide*.

This namespace contains the following variables:

connection:max_unsent_data

`plugins:iiop:connection:max_unsent_data` specifies the upper limit for the amount of unsent data associated with an individual connection. Defaults to 512k.

incoming_connections:hard_limit

`plugins:iiop:incoming_connections:hard_limit` specifies the maximum number of incoming (server-side) connections permitted to IIOP. IIOP does not accept new connections above this limit. Defaults to -1 (disabled).

incoming_connections:soft_limit

`plugins:iiop:incoming_connections:soft_limit` sets the number of connections at which IIOP begins closing incoming (server-side) connections. Defaults to -1 (disabled).

ip:send_buffer_size

`plugins:iiop:ip:send_buffer_size` specifies the `SO_SNDBUF` socket options to control how the IP stack adjusts the size of the output buffer. Defaults to 0, meaning the that buffer size is static.

ip:receive_buffer_size

`plugins:iiop:ip:receive_buffer_size` specifies the `SO_RCVBUF` socket options to control how the IP stack adjusts the size of the input buffer. Defaults to 0, meaning the that buffer size is static.

ip:reuse_addr

`plugins:iiop:ip:reuse_addr` specifies whether a process can be launched on an already used port. The default is `true`. Setting this to `false` switches `SO_REUSEADDR` to `false`. This does not allow a process to listen on the same port. An exception indicating that the address is already in use will be thrown.

outgoing_connections:hard_limit

`plugins:iiop:outgoing_connections:hard_limit` sets the maximum number of outgoing (client-side) connections permitted to IIOP. IIOP does not allow new outgoing connections above this limit. Defaults to -1 (disabled).

outgoing_connections:soft_limit

`plugins:iiop:outgoing_connections:soft_limit` specifies the number of connections at which IIOP begins closing outgoing (client-side) connections. Defaults to -1 (disabled).

pool:max_threads

`plugins:iiop:pool:max_threads` specifies the maximum number of threads reserved from the `WorkQueue` to support tasks working on behalf of the ATLI transport. Defaults to 5.

pool:min_threads

`plugins:iiop:pool:min_threads` specifies the minimum number of threads reserved from the `WorkQueue` to support tasks working on behalf of the ATLI transport. Defualts to 1.

tcp_connection:keep_alive

`plugins:iiop:tcp_connection:keep_alive` specifies the setting of `SO_KEEPALIVE` on sockets used to maintain IIOP connections. If set to `TRUE`, the socket will send a *'keepalive probe'* to the remote host if the conneciton has been idle for a preset period of time. The remote system, if it is still running, will send an `ACK` response. Defaults to `TRUE`.

tcp_connection:no_delay

`plugins:iiop:tcp_connection:no_deplay` specifies if `TCP_NODELAY` is set on the sockets used to maintain IIOP connections. If set to false, small data packets are collected and sent as a group. The algorithm used allows for no more than a 0.2 msec delay between collected packets. Defaults to `TRUE`.

tcp_connection:linger_on_close

`plugins:iiop:tcp_connection:linger_on_close` specifies the setting of `SO_LINGER` on all tcp connections to ensure that tcp buffers get cleared once a socket is closed. Defaults to `TRUE`.

tcp_listener:reincarnate_attempts

(C++/Windows only)

`plugins:iiop:tcp_listener:reincarnate_attempts` specifies the number of attempts that are made to reincarnate a listener before giving up, logging a fatal error, and shutting down the ORB. Datatype is `long`. Defaults to `0` (no attempts).

Sometimes an network error may occur, which results in a listening socket being closed. On Windows, you can configure the listener to attempt a reincarnation. This enables new connections to be established.

tcp_listener:reincarnation_retry_backoff_ratio

(C++/Windows only)
`plugins:iiop:tcp_listener:reincarnation_retry_delay` specifies a delay between reincarnation attempts. Data type is `long`. Defaults to `0` (no delay).

tcp_listener:reincarnation_retry_delay

(C++/Windows only)
`plugins:iiop:tcp_listener:reincarnation_retry_backoff_ratio` specifies the degree to which delays between retries increase from one retry to the next. Datatype is `long`. Defaults to `1`.

plugins:naming

The variables in this namespace configure the naming service plugin. The naming service allows you to associate abstract names with CORBA objects, enabling clients to locate your objects.

This namespace contains the following variables:

- destructive_methods_allowed
- direct_persistence
- iiop:port
- lb_default_initial_load
- lb_default_load_timeout
- nt_service_dependencies

destructive_methods_allowed

destructive_methods_allowed specifies if users can make destructive calls, such as destroy(), on naming service elements. The default value is true, meaning the destructive methods are allowed.

direct_persistence

direct_persistence specifies if the service runs using direct or indirect persistence. The default value is false, meaning indirect persistence.

iiop:port

iiop:port specifies the port that the service listens on when running using direct persistence.

lb_default_initial_load

`lb_default_initial_load` specifies the default initial load value for a member of an active object group. The load value is valid for a period of time specified by the timeout assigned to that member. Defaults to `0.0`. For more information, see the *Orbix Administrator's Guide*.

lb_default_load_timeout

`lb_default_load_timeout` specifies the default load timeout value for a member of an active object group. The default value of `-1` indicates no timeout. This means that the load value does not expire. For more information, see the *Orbix Administrator's Guide*.

nt_service_dependencies

`nt_service_dependencies` specifies the naming service's dependencies on other NT services. The dependencies are listed in the following format:

```
IT ORB-name domain-name
```

This variable only has meaning if the naming service is installed as an NT service.

plugins:ots

The variables in this namespace configure the object transaction service (OTS) generic plugin. The generic OTS plugin contains client and server side transaction interceptors and the implementation of `CosTransactions::Current`. For details of this plugin, refer to the *CORBA OTS Guide*.

The `plugins:ots` namespace contains the following variables:

- `default_ots_policy`
- `default_transaction_policy`
- `default_transaction_timeout`
- `interposition_style`
- `jit_transactions`
- `ots_v11_policy`
- `propagate_separate_tid_optimization`
- `rollback_only_on_system_ex`
- `support_ots_v11`
- `transaction_factory_name`

default_ots_policy

`default_ots_policy` specifies the default `OTSPolicy` value used when creating a POA. Set to one of the following values:

```
requires
forbids
adapts
```

If no value is specified, no `OTSPolicy` is set for new POAs.

default_transaction_policy

`default_transaction_policy` specifies the default `TransactionPolicy` value used when creating a POA.

Set to one of the following values:

- `requires` corresponds to a `TransactionPolicy` value of `Requires_shared`.
- `allows` corresponds to a `TransactionPolicy` value of `Allows_shared`.

If no value is specified, no `TransactionPolicy` is set for new POAs.

default_transaction_timeout

`default_transaction_timeout` specifies the default timeout, in seconds, of a transaction created using `CosTransactions::Current`. A value of zero or less specifies no timeout. Defaults to `30` seconds.

interposition_style

`interposition_style` specifies the style of interposition used when a transaction first visits a server. Set to one of the following values:

- `standard`: A new subordinator transaction is created locally and a resource is registered with the superior coordinator. This subordinate transaction is then made available through the `Current` object.
- `proxy`: (default) A locally constrained proxy for the imported transaction is created and made available though the `Current` object.

Proxy interposition is more efficient, but if you need to further propagate the transaction explicitly (using the `Control` object), standard interposition must be specified.

jit_transactions

`jit_transactions` is a boolean which determines whether to use just-in-time transaction creation. If set to `true`, transactions created using `Current::begin()` are not actually created until necessary. This can be used in conjunction with an `OTSPolicy` value of `SERVER_SIDE` to delay creation of a transaction until an invocation is received in a server. Defaults to `false`.

ots_v11_policy

`ots_v11_policy` specifies the effective `OTSPolicy` value applied to objects determined to support `CosTransactions::TransactionalObject`, if `support_ots_v11` is set to `true`.

Set to one of the following values:

- `adapts`
- `requires`

propagate_separate_tid_optimization

`propagate_separate_tid_optimization` specifies whether an optimization is applied to transaction propagation when using C++ applications. Must be set for both the sender and receiver to take affect. Defaults to `true`.

rollback_only_on_system_ex

`rollback_only_on_system_ex` specifies whether to mark a transaction for rollback if an invocation on a transactional object results in a system exception being raised. Defaults to `true`.

support_ots_v11

`support_ots_v11` specifies whether there is support for the OMG OTS v1.1 `CosTransactions::TransactionalObject` interface. This option can be used in conjunction with `ots_v11_policy`. When this option is enabled, the OTS interceptors might need to use remote `_is_a()` calls to determine the type of an interface. Defaults to `false`.

transaction_factory_name

`transaction_factory_name` specifies the initial reference for the transaction factory. This option must match the corresponding entry in the configuration scope of your transaction service implementation. Defaults to `TransactionFactory`.

plugins:ots_lite

The variables in this namespace configure the Lite implementation of the object transaction service. The `ots_lite` plugin contains an implementation of `CosTransacitons::TransactionFactory` which is optimized for use in a single resource system. For details, see the *CORBA Programmer's Guide*.

This namespace contains the following variables:

- `orb_name`
- `otid_format_id`
- `superior_ping_timeout`
- `transaction_factory_name`
- `transaction_timeout_period`
- `use_internal_orb`

orb_name

`orb_name` specifies the ORB name used for the plugin's internal ORB when `use_internal_orb` is set to `true`. The ORB name determines where the ORB obtains its configuration information and is useful when the application ORB configuration needs to be different from that of the internal ORB. Defaults to the ORB name of the application ORB.

otid_format_id

`otid_format_id` specifies the value of the `formatID` field of a transaction's identifier (`CosTransactions::otid_t`). Defaults to `0x494f4e41`.

superior_ping_timeout

`superior_ping_timeout` specifies, in seconds, the timeout between queries of the transaction state, when standard interposition is being used to recreate a foreign transaction. The interposed resource periodically queries the recovery coordinator, to ensure that the transaction is still alive when the timeout of the superior transaction has expired. Defaults to `30`.

transaction_factory_name

`transaction_factory_name` specifies the initial reference for the transaction factory. This option must match the corresponding entry in the configuration scope of your generic OTS plugin to allow it to successfully resolve a transaction factory. Defaults to `TransactionFactory`.

transaction_timeout_period

`transaction_timeout_period` specifies the time, in milliseconds, of which all transaction timeouts are multiples. A low value increases accuracy of transaction timeouts, but increases overhead. This value is added to all transaction timeouts. To disable all timeouts, set to `0` or a negative value. Defaults to `1000`.

use_internal_orb

`use_internal_orb` specifies whether the ots_lite plugin creates an internal ORB for its own use. By default, `ots_lite` creates POAs in the application's ORB. This option is useful if you want to isolate the transaction service from your application ORB. Defaults to `false`.

plugins:ots_encina

The `plugins:ots_encina` namespace stores configuration variables for the Encina OTS plugin. The `ots_encina` plugin contains an implementation of IDL interface `CosTransactions::TransactionFactory` that supports the recoverable 2PC protocol. For details, see the *CORBA OTS Guide*.

This namespace contains the following variables:

- `agent_ior_file`
- `allow_registration_after_rollback_only`
- `backup_restart_file`
- `direct_persistence`
- `direct_persistence`
- `global_namespace_poa`
- `iiop:port`
- `initial_disk`
- `initial_disk_size`
- `log_threshold`
- `log_check_interval`
- `max_resource_failures`
- `namespace_poa`
- `orb_name`
- `otid_format_id`
- `resource_retry_timeout`
- `restart_file`
- `trace_comp`
- `trace_file`
- `trace_on`
- `transaction_factory_name`
- `transaction_factory_ns_name`
- `transaction_timeout_period`
- `use_internal_orb`
- `use_raw_disk`

agent_ior_file

`agent_ior_file` specifies the file path where the management agent object's IOR is written. Defaults to an empty string.

allow_registration_after_rollback_only

`allow_registration_after_rollback_only` (C++ only) specifies whether registration of resource objects is permitted after a transaction is marked for rollback.

- `true` specifies that resource objects can be registered after a transaction is marked for rollback.
- `false` (default) specifies that resource objects cannot be registered once a transaction is marked for rollback.

This has no effect on the outcome of the transaction.

backup_restart_file

`backup_restart_file` specifies the path for the backup restart file used by the Encina OTS to locate its transaction logs. If unspecified, the backup restart file is the name of the primary restart file—set with `restart_file`—with a `.bak` suffix. Defaults to an empty string.

direct_persistence

`direct_persistence` specifies whether the transaction factory object can use explicit addressing—for example, a fixed port. If set to `true`, the addressing information is picked up from `plugins:ots_encina`. For example, to use a fixed port, set `plugins_ots_encina:iiop:port`. Defaults to `false`.

global_namespace_poa

`global_namespace_poa` specifies the top-level transient POA used as a namespace for OTS implementations. Defaults to `iOTS`.

iiop:port

`iiop:port` specifies the port that the service listens on when using direct persistence.

initial_disk

`initial_disk` specifies the path for the initial file used by the Encina OTS for its transaction logs. Defaults to an empty string.

initial_disk_size

`initial_disk_size` specifies the size of the initial file used by the Encina OTS for its transaction logs. Defaults to `2`.

log_threshold

`log_threshold` specifies the percentage of transaction log space, which, when exceeded, results in a management event. Must be between `0` and `100`. Defaults to `90`.

log_check_interval

`log_check_interval` specifies the time, in seconds, between checks for transaction log growth. Defaults to `60`.

max_resource_failures

`max_resource_failures` specifies the maximum number of failed invocations on `CosTransaction::Resource` objects to record. Defaults to `5`.

namespace_poa

`namespace_poa` specifies the transient POA used as a namespace. This is useful when there are multiple instances of the plugin being used; each instance must use a different namespace POA to distinguish itself. Defaults to `Encina`.

orb_name

`orb_name` specifies the ORB name used for the plugin's internal ORB when `use_internal_orb` is set to `true`. The ORB name determines where the ORB obtains its configuration information, and is useful when the application ORB configuration needs to be different from that of the internal ORB. Defaults to the ORB name of the application ORB.

otid_format_id

`otis_format_id` specifies the value of the `formatID` field of a transaction's identifier (`CosTransactions::otid_t`). Defaults to `0x494f4e41`.

resource_retry_timeout

`resource_retry_timeout` specifies the time, in seconds, between retrying a failed invocation on a resource object. A negative value means the default is used. Defaults to `5`.

restart_file

`restart_file` specifies the path for the restart file used by the Encina OTS to locate its transaction logs. Defaults to an empty string.

trace_comp

`trace_`*comp* sets the Encina trace levels for the component *comp*, where *comp* is one of the following:

```
bde
log
restart
tran
tranLog_log
tranLog_tran
util
vol
```

Set this variable to a bracket-enclosed list that includes one or more of the following string values:

- `event`: interesting events.
- `entry`: entry to a function.
- `param`: parameters to a function.
- `internal_entry`: entry to internal functions.
- `internal_param`: parameters to internal functions.
- `global`.

Defaults to `[]`.

trace_file

`trace_file` specifies the file to which Encina level tracing is written when enabled via `trace_on`. If not set or set to an empty string, Encina level transactions are written to standard error. Defaults to an empty string.

trace_on

`trace_on` specifies whether Encina level tracing is enabled. If set to `true`, the information that is output is determined from the trace levels (see `trace_comp`). Defaults to `false`.

transaction_factory_name

`transaction_factory_name` specifies the initial reference for the transaction factory. This option must match the corresponding entry in the configuration scope of your generic OTS plugin to allow it to successfully resolve a transaction factory. Defaults to `TransactionFactory`.

transaction_factory_ns_name

`transaction_factory_ns_name` specifies the name used to publish the transaction factory reference in the naming service. Defaults to an empty string.

transaction_timeout_period

`transaction_timeout_period` specifies the time, in milliseconds, of which all transaction timeouts are multiples. A low value increases accuracy of transaction timeouts, but increases overhead. This value multiplied to all transaction timeouts. To disable all timeouts, set to `0` or a negative value. Defaults to `1000`.

use_internal_orb

`use_internal_orb` specifies whether the `ots_encina` plugin creates an internal ORB for its own use. By default the `ots_encina` plugin creates POA's in the application's ORB. This option is useful if you want to isolate the transaction service from your application ORB. Defaults to `false`.

use_raw_disk

use_raw_disk specifies whether the path specified by `initial_disk` is of a raw disk (`true`) or a file (`false`). If set to `false` and the file does not exist, the Encina OTS plugin tries to create the file with the size specified in `initial_disk_size`. Defaults to `false`.

plugins:poa

This namespace contains variables to configure the CORBA POA plug-in. It contains the following variables:

- root_name

root_name

root_name specifies the name of the root POA, which is added to all fully-qualified POA names generated by that POA. If this variable is not set, the POA treats the root as an anonymous root, effectively acting as the root of the location domain.

poa:FQPN

The POA namespace includes variables that allow you to use direct persistence and well-known addressing for POAs (Portable Object Adaptors). These variables specify the policy for individual POAs by specifying the fully qualified POA name for each POA. They take the form:

```
poa:FQPN:Variable
```

For example to set the well-known address for a POA whose fully qualified POA name is `helloworld` you would set the variable `poa:helloworld:well_known_address`.

The following variables are in this namespace:

- `direct_persistent`
- `well_known_address`

direct_persistent

`direct_persistent` specifies if a POA runs using direct persistence. If this is set to `true` the POA generates IORs using the well-known address that is specified in the `well_known_address` varaible. Defaults to `false`. For an example of how this works, see `well_known_address`.

well_known_address

`well_known_address` specifies the address used to generate IORs for the associated POA when that POA's `direct_persistent` varaible is set to `true`.

For example, to run your server using direct persistence, and well known addressing, add the following to your configuration:

```
poa:helloworld:direct_persistent = "true";
poa:helloworld:well_known_address = "helloworld_port";
helloworld_port:iiop:port = "9202";
```

This corresponds to the following WSDL:

```
<service name="CorbaService">
   <port binding="corbatm:CorbaBinding" name="CorbaPort">
      <corba:address location="file:../../hello_world_service.ior"/>
          <corba:policy poaname="helloworld"/>
    </port>
</service>
```

Using these configuration variables, all object references created by the `helloworld` POA will now be direct persistent containing the well known IIOP address of port `9202`.

If your POA name is different, the configuration variables must be modified. The scheme used is the following:

```
poa:FQPN:direct_persistent=BOOL;
poa:FQPN:well_known_address=Address_Prefix;
Address_Prefix:iiop:port=LONG;
```

`FQPN` is the fully qualified POA name. This introduces the restriction that your POA name can only contain printable characters, and may not contain white space.

`Address_Prefix` is the string that gets passed to the well-known addressing POA policy. Specify the actual port used using the *`Address_Prefix`*`:iiop:port` variable. You can also use `iiop_tls` instead of `iiop`.

Core Policies

Configuration variables for core policies include:

- non_tx_target_policy
- rebind_policy
- routing_policy_max
- routing_policy_min
- sync_scope_policy
- work_queue_policy

non_tx_target_policy

non_tx_target_policy specifies the default NonTxTargetPolicy value for use when a non-transactional object is invoked within a transaction. Set to one of the following values:

permit	Maps to the NonTxTargetPolicy value PERMIT.
prevent	Maps to the NonTxTargetPolicy value PREVENT.(default)

rebind_policy

rebind_policy specifies the default value for RebindPolicy. Can be one of the following:

TRANSPARENT(default)

NO_REBIND

NO_RECONNECT

routing_policy_max

routing_policy_max specifies the default maximum value for RoutingPolicy. You can set this to one of the following:

ROUTE_NONE(default)

ROUTE_FORWARD

ROUTE_STORE_AND_FORWARD

routing_policy_min

routing_policy_min specifies the default minimum value for RoutingPolicy. You can set this to one of the following:

ROUTE_NONE(default)

ROUTE_FORWARD

ROUTE_STORE_AND_FORWARD

sync_scope_policy

sync_scope_policy specifies the default value for SyncScopePolicy. You can set this to one of the following:

SYNC_NONE

SYNC_WITH_TRANSPORT(default)

SYNC_WITH_SERVER

SYNC_WITH_TARGET

work_queue_policy

work_queue_policy specifies the default WorkQueue to use for dispatching GIOP Requests and LocateRequests when the WorkQueuePolicy is not effective. You can set this variable to a string that is resolved using ORB.resolve_initial_references().

For example, to dispatch requests on the internal multi-threaded work queue, this variable should be set to IT_MultipleThreadWorkQueue. Defaults to IT_DirectDispatchWorkQueue. For more information about WorkQueue policies, see the *CORBA Programmer's Guide*.

CORBA Timeout Policies

Orbix supports standard CORBA timeout policies, to enable clients to abort invocations. IONA also provides proprietary policies, which enable more fine-grained control. Configuration variables for standard CORBA timeout policies include:

- `relative_request_timeout`
- `relative_roundtrip_timeout`

relative_request_timeout

`relative_request_timeout` specifies how much time, in milliseconds, is allowed to deliver a request. Request delivery is considered complete when the last fragment of the GIOP request is sent over the wire to the target object. There is no default value.

The timeout period includes any delay in establishing a binding. This policy type is useful to a client that only needs to limit request delivery time.

relative_roundtrip_timeout

`relative_roundtrip_timeout` specifies how much time, in milliseconds, is allowed to deliver a request and its reply. There is no default value.

The timeout countdown starts with the request invocation, and includes:

- Marshalling in/inout parameters.
- Any delay in transparently establishing a binding.

If the request times out before the client receives the last fragment of reply data, the request is cancelled using a GIOP `CancelRequest` message and all received reply data is discarded.

For more information about standard CORBA timeout policies, see the *CORBA Programmer's Guide*.

IONA Timeout Policies

This section lists configuration variables for the IONA-specific timeout policies, which enable more fine-grained control than the standard CORBA policies. IONA-specific variables in the `policies` namespace include:

- `relative_binding_exclusive_request_timeout`
- `relative_binding_exclusive_roundtrip_timeout`
- `relative_connection_creation_timeout`

relative_binding_exclusive_request_timeout

`relative_binding_exclusive_request_timeout` specifies how much time, in milliseconds, is allowed to deliver a request, exclusive of binding attempts. The countdown begins immediately after a binding is obtained for the invocation. There is no default value.

relative_binding_exclusive_roundtrip_timeout

`relative_binding_exclusive_roundtrip_timeout` specifies how much time, in milliseconds, is allowed to deliver a request and receive its reply, exclusive of binding attempts. There is no default value.

relative_connection_creation_timeout

`relative_connection_creation_timeout` specifies how much time, in milliseconds, is allowed to resolve each address in an IOR, within each binding iteration. Default is 8 seconds.

An IOR can have several `TAG_INTERNET_IOP` (IIOP transport) profiles, each with one or more addresses, while each address can resolve via DNS to multiple IP addresses. Furthermore, each IOR can specify multiple transports, each with its own set of profiles.

This variable applies to each IP address within an IOR. Each attempt to resolve an IP address is regarded as a separate attempt to create a connection.

policies:giop

The variables in this namespace set policies that control the behavior of bidirectional GIOP. This feature allows callbacks to be made using a connection opened by the client, instead of requiring the server to open a new connection for the callback. The `policies:giop` namespace includes the following variables:

- "bidirectional_accept_policy".
- "bidirectional_export_policy".
- "bidirectional_gen3_accept_policy".
- "bidirectional_offer_policy".

bidirectional_accept_policy

`bidirectional_accept_policy` specifies the behavior of the accept policy used in bidirectional GIOP. On the server side, the `BiDirPolicy::BiDirAcceptPolicy` for the callback invocation must be set to `ALLOW`. You can set this in configuration as follows:

```
policies:giop:bidirectional_accept_policy="ALLOW";
```

This accepts the client's bidirectional offer, and uses an incoming connection for an outgoing request, as long the policies effective for the invocation are compatible with the connection.

bidirectional_export_policy

`bidirectional_export_policy` specifies the behavior of the export policy used in birdirectional GIOP. A POA used to activate a client-side callback object must have an effective `BiDirPolicy::BiDirExportPolicy` set to `BiDirPolicy::ALLOW`. You can set this in configuration as follows:

```
policies:giop:bidirectional_export_policy="ALLOW";
```

Alternatively, you can do this programmatically by including this policy in the list passed to `POA::create_POA()`.

bidirectional_gen3_accept_policy

`bidirectional_gen3_accept_policy` specifies whether interoperability with Orbix 3.x is enabled. Set this variable to `ALLOW` to enable interoperability with Orbix 3.x:

```
policies:giop:bidirectional_gen3_accept_policy="ALLOW";
```

This allows an Orbix 6.x server to invoke on an Orbix 3.x callback reference in a bidirectional fashion.

bidirectional_offer_policy

`bidirectional_offer_policy` specifies the behavior of the offer policy used in bidirectional GIOP. A bidirectional offer is triggered for an outgoing connection by setting the effective `BiDirPolicy::BiDirOfferPolicy` to `ALLOW` for an invocation. You can set this in configuration as follows:

```
policies:giop:bidirectional_offer_policy="ALLOW";
```

Further information

For more information on all the steps involved in setting bidirectional GIOP, see the *Orbix Administrator's Guide*.

policies:giop:interop_policy

The policies:giop:interop_policy child namespace contains variables used to configure interoperability with previous versions of IONA products. It contains the following variables:

- allow_value_types_in_1_1
- enable_principal_service_context
- ignore_message_not_consumed
- negotiate_transmission_codeset
- send_locate_request
- send_principal

allow_value_types_in_1_1

allow_value_types_in_1_1 relaxes GIOP 1.1 complaince to allow valuetypes to be passed by Java ORBs using GIOP 1.1. This functionality can be important when interoperating with older ORBs that do not support GIOP 1.2. To relax GIOP 1.1 compliance, set this variable to true.

enable_principal_service_context

enable_principal_service_context specifies whether to permit a prinicipal user identifier to be sent in the service context of CORBA requests. This is used to supply an ORB on the mainframe with a user against which basic authorization can take place.

Typically, on the mid-tier, you may want to set the principal to a user that can be authorized on the mainframe. This can be performed on a per-request basis in a portable interceptor. See the *CORBA Programmer's Guide* for how to write portable interceptors.

To enable principal service contexts, set this variable to true:

```
policies:giop:interop_policy:enable_principal_service_context="true";
```

ignore_message_not_consumed

ignore_message_not_consumed specifies whether to raise MARSHAL exceptions when interoperating with ORBs that set message size incorrectly, or with earlier versions of Orbix if it sends piggyback data. The default value is false.

The MARSHAL exception is set with one of the following minor codes:

- REQUEST_MESSAGE_NOT_CONSUMED
- REPLY_MESSAGE_NOT_CONSUMED

negotiate_transmission_codeset

negotiate_transmisission_codeset specifies whether to enable codeset negotiation for wide characters used by some third-party ORBs, previous versions of Orbix, and OrbixWeb. Defaults to true.

If this variable is set to true, native and conversion codesets for char and wchar are advertised in IOP::TAG_CODE_SETS tagged components in published IORs. The transmission codesets are negotiated by clients and transmitted using an IOP::CodeSets service context.

If the variable is false, negotiation does not occur and Orbix uses transmission codesets of UTF-16 and ISO-Latin-1 for wchar and char types, respectively. Defaults to true.

send_locate_request

send_locate_request specifies whether GIOP sends LocateRequest messages before sending initial Request messages. Required for interoperability with Orbix 3.0. Defaults to true.

send_principal

send_principal specifies whether GIOP sends Principal information containing the current user name in GIOP 1.0 and GIOP 1.1 requests. Required for interoperability with Orbix 3.0 and Orbix for OS/390. Defaults to false.

policies:iiop

The `policies:iiop` namespace contains variables used to set IIOP-related policies. It contains the following variables:

- `client_address_mode_policy:local_hostname`
- `client_address_mode_policy:port_range`
- `client_version_policy`
- `buffer_sizes_policy:default_buffer_size`
- `buffer_sizes_policy:max_buffer_size`
- `server_address_mode_policy:local_hostname`
- `server_address_mode_policy:port_range`
- `server_address_mode_policy:publish_hostname`
- `server_version_policy`
- `tcp_options_policy:no_delay`
- `tcp_options_policy:recv_buffer_size`
- `tcp_options_policy:send_buffer_size`

client_address_mode_policy:local_hostname

`client_address_mode_policy:local_hostname` specifies the host name that is used by the client.

This variable enables support for *multi-homed* client hosts. These are client machines with multiple hostnames or IP addresses (for example, those using multiple DNS aliases or multiple network interface cards). The `local_hostname` variable enables you to explicitly specify the host name that the client listens on.

For example, if you have a client machine with two network addresses (`207.45.52.34` and `207.45.52.35`), you can explicitly set this variable to either address:

```
policies:iiop:client_address_mode_policy:local_hostname =
   "207.45.52.34";
```

By default, the `local_hostname` variable is unspecified, and the client uses the `0.0.0.0` wildcard address. In this case, the network interface card used is determined by the operating system.

client_address_mode_policy:port_range

(C++ only) `client_address_mode_policy:port_range` specifies the range of ports that a client uses when there is no well-known addressing policy specified for the port. Specified values take the format of *`from_port`*`:`*`to_port`*, for example:

```
policies:iiop:client_address_mode_policy:port_range="4003:4008"
```

client_version_policy

`client_version_policy` specifies the highest GIOP version used by clients. A client uses the version of GIOP specified by this variable, or the version specified in the IOR profile, whichever is lower. Valid values for this variable are: `1.0`, `1.1`, and `1.2`.

For example, the following file-based configuration entry sets the server IIOP version to `1.1`.

```
policies:iiop:server_version_policy="1.1";
```

The following `itadmin` command set this variable:

```
itadmin variable modify -type string -value "1.1"
   policies:iiop:server_version_policy
```

buffer_sizes_policy:default_buffer_size

`buffer_sizes_policy:default_buffer_size` specifies, in bytes, the initial size of the buffers allocated by IIOP. Defaults to 16000. This value must be greater than 80 bytes, and must be evenly divisible by 8.

buffer_sizes_policy:max_buffer_size

`buffer_sizes_policy:max_buffer_size` specifies the maximum buffer size permitted by IIOP, in kilobytes. Defaults to -1, which indicates unlimited size. If not unlimited, this value must be greater than 80.

server_address_mode_policy:local_hostname

`server_address_mode_policy:local_hostname` specifies the server host name that is advertised by the locator daemon, and listened on by server-side IIOP.

This variable enables support for *multi-homed* server hosts. These are server machines with multiple hostnames or IP addresses (for example, those using multiple DNS aliases or multiple network interface cards). The `local_hostname` variable enables you to explicitly specify the host name that the server listens on and publishes in its IORs.

For example, if you have a machine with two network addresses (`207.45.52.34` and `207.45.52.35`), you can explicitly set this variable to either address:

```
policies:iiop:server_address_mode_policy:local_hostname =
   "207.45.52.34";
```

By default, the `local_hostname` variable is unspecified. Servers use the default hostname configured for the machine with the Orbix configuration tool.

server_address_mode_policy:port_range

server_address_mode_policy:port_range specifies the range of ports that a server uses when there is no well-known addressing policy specified for the port. Specified values take the format of *from_port:to_port*, for example:

```
policies:iiop:server_address_mode_policy:port_range="4003:4008"
```

server_address_mode_policy:publish_hostname

server_address_mode-policy:publish_hostname specifes whether IIOP exports hostnames or IP addresses in published profiles. Defaults to false (exports IP addresses, and does not export hostnames). To use hostnames in object references, set this variable to true, as in the following file-based configuration entry:

```
policies:iiop:server_address_mode_policy:publish_hostname=true
```

The following itadmin command is equivalent:

```
itadmin variable create -type bool -value true
   policies:iiop:server_address_mode_policy:publish_hostname
```

server_version_policy

server_version_policy specifies the GIOP version published in IIOP profiles. This variable takes a value of either 1.1 or 1.2. Orbix servers do not publish IIOP 1.0 profiles. The default value is 1.2.

tcp_options_policy:no_delay

tcp_options_policy:no_delay specifies whether the TCP_NODELAY option should be set on connections. Defaults to false.

tcp_options_policy:recv_buffer_size

`tcp_options_policy:recv_buffer_size` specifies the size of the TCP receive buffer. This variable can only be set to `0`, which coresponds to using the default size defined by the operating system.

tcp_options_policy:send_buffer_size

`tcp_options_policy:send_buffer_size` specifies the size of the TCP send buffer. This variable can only be set to `0`, which coresponds to using the default size defined by the operating system.

policies:invocation_retry

The `policies:invocation_retry` namespace contains variables that determine how a CORBA ORB reinvokes or rebinds requests that raise the following exceptions:

- `TRANSIENT` with a completion status of `COMPLETED_NO` (triggers transparent reinvocations).
- `COMM_FAILURE` with a completion status of `COMPLETED_NO` (triggers transparent rebinding).

This namespace contains the following variables:

- `backoff_ratio`
- `initial_retry_delay`
- `max_forwards`
- `max_rebinds`
- `max_retries`

backoff_ratio

`backoff_ratio` specifies the degree to which delays between invocation retries increase from one retry to the next. Defaults to `2`.

initial_retry_delay

`initial_retry_delay` specifies the amount of time, in milliseconds, between the first and second retries. Defaults to `100`.

Note: The delay between the initial invocation and first retry is always `0`.

max_forwards

`max_forwards` specifies the number of forward tries allowed for an invocation. Defaults to `20`. To specify unlimited forward tries, set to `-1`.

max_rebinds

`max_rebinds` specifies the number of transparent rebinds attempted on receipt of a `COMM_FAILURE` exception. Defaults to `5`.

Note: This setting is valid only if the effective `RebindPolicy` is `TRANSPARENT`; otherwise, no rebinding occurs. For more information, see "rebind_policy" on page 250.

max_retries

`max_retries` specifies the number of transparent reinvocations attempted on receipt of a `TRANSIENT` exception. Defaults to `5`.

For more information about proprietary IONA timeout policies, see the *CORBA Programmer's Guide*.

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