Spectra ORB C++ Edition

Lightweight Naming Service Guide



PRISMTECH

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Spectra ORB
C++ Edition

Lightweight Naming Service Guide

PrismTech

Part Number: EORBCPP-NAMLWG

Doc Issue 30, 4 June 2013

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Copyright Notice

© 2013 PrismTech Limited. All rights reserved.

This document may be reproduced in whole but not in part.

The information contained in this document is subject to change without notice and is made available in good faith without liability on the part of PrismTech Limited or PrismTech Corporation.

All trademarks acknowledged.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Contents

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Table of Contents

Preface

About the Lightweight Naming Service Guide vii
Contacts viii

Introduction

Description 3
OMG Standard Features 3

The Spectra ORB Lightweight Naming Service

Chapter 1 Basic Concepts 7
1.1 OMG Standard Features 7
1.1.1 Names 7
1.1.2 Naming Contexts 8

Chapter 2 Specific Features 11
2.1 Naming Context Creation and Destruction 12
2.2 Object Binding and Unbinding Operations 12
2.3 Accessing Objects and Naming Contexts 13

Chapter 3 Using the Service 15
3.1 Running the Service 15
3.1.1 Embedding the Service 15
3.1.1.1 POA Argument Choices 16
3.1.1.2 Configuration Structure 16
3.1.1.3 Example Server Module 17
3.1.2 Running from the Command Line 19
3.1.2.1 Example 19
3.1.3 Running on a Fixed Endpoint 20

Chapter 4 Creating Applications 21
4.1 A Basic Application 21
4.1.1 Registering Objects 22
4.1.1.1 Obtaining the Root Context 22
4.1.1.2 Example server source code 22
4.1.1.3 Example client source code 24

Chapter 5 Supplemental Information 29
5.1 Exceptions 29

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Appendix A **Examples' Source Code** **33**

Index **37**

PRISMTECH
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Preface

About the Lightweight Naming Service Guide

The *Lightweight Naming Service Guide* explains how to use the Spectra ORB Lightweight Naming Service C++ Edition product.

Intended Audience

The *Lightweight Naming Service Guide* is intended to be used by developers who wish to integrate the Spectra ORB Lightweight Naming Service into products which comply with OMG standards for object services. Readers should have a good understanding of the relevant programming languages (for example C++, IDL) and of the relevant underlying technologies (for example, CORBA).

Organisation

The *Lightweight Naming Service Guide* provides:

- a high level description and list of main features
- explanations of the OMG Naming Service architecture and concepts
- descriptions of how to configure, run and deploy the Spectra ORB Lightweight Naming Service
- descriptions of how to create applications using the Spectra ORB Lightweight Naming Service
- other information about the service

Conventions

The conventions listed below are used to guide and assist the reader in understanding the Lightweight Naming Service Guide.


Item of special significance or where caution needs to be taken.

i
Item contains helpful hint or special information.

WIN
Information applies to Windows (*e.g.* XP, Vista, Windows 7) only.

UNIX
Information applies to Unix-based systems (*e.g.* Solaris) only.

C
C language specific.

C++
C++ language specific.

Java
Java language specific.

Hypertext links are shown as *blue italic underlined*.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

On-Line (PDF) versions of this document: Items shown as cross references to other parts of the document, *e.g. Contacts* on page viii, behave as hypertext links: users can jump to that section of the document by clicking on the cross reference.

```
%  Commands or input which the user enters on the
   command line of their computer terminal
```

`Courier`, **`Courier Bold`**, or *`Courier Italic`* fonts indicate programming code and file names.

Extended code fragments are shown in shaded boxes:

```
NameComponent newName[] = new NameComponent[1];

// set id field to “example” and kind field to an empty string
newName[0] = new NameComponent (“example”, “”);
```

Italics and ***Italic Bold*** are used to indicate new terms, or emphasise an item.

Arial Bold is used to indicate user related actions, *e.g.* **File > Save** from a menu.

Step 1: One of several steps required to complete a task.

Contacts

PrismTech can be reached at the following contact points for information and technical support.

USA Corporate Headquarters	**European Head Office**
PrismTech Corporation 400 TradeCenter Suite 5900 Woburn, MA 01801 USA	PrismTech Limited PrismTech House 5th Avenue Business Park Gateshead NE11 0NG UK
Tel: +1 781 569 5819	Tel: +44 (0)191 497 9900 Fax: +44 (0)191 497 9901

Web: *http://www.prismtech.com*
Technical questions: *crc@prismtech.com* (Customer Response Center)
Sales enquiries: *sales@prismtech.com*

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Introduction

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Description

The Spectra ORB Lightweight Naming Service C++ Edition provides a straightforward way of finding and using objects by associating meaningful, human-understandable names to those objects. The Spectra ORB Lightweight Naming Service is used like the white pages of a telephone directory to find an object and obtain its object reference, without the need to resort to complex programming or proprietary ORB mechanisms.

The Spectra ORB Lightweight Naming Service C++ Edition is compliant with the OMG's Lightweight Naming Service Specification and satisfies the Naming Service requirements of the Software Communications Architecture (SCA).

The OMG's Lightweight Naming Service Specification is a sub-set of the full OMG specification and is intended to provide a service which has a minimal footprint and uses a minimum of resources. This service is designed for use in restricted deployment environments, such as in embedded systems and in the Software Defined Radio (SDR) domain.

This implementation has been designed and implemented to be as small and as proficient as possible: it is designed for use in highly demanding environments where footprint size and resources are limited.



The Spectra ORB Lightweight Naming Service C++ Edition does ***not*** support the `kind` property of the `CosNaming::NameComponent`. The Service will ignore this property when binding or resolving names. Developers should ensure that they use unique `id` values creating name components.

OMG Standard Features

The Spectra ORB Lightweight Naming Service provides the following OMG specified features:

- enable objects to be located by using human-intelligible names by binding names to objects
- add and remove name bindings
- change the object which a name is bound to
- group names in logical hierarchies

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



The Spectra ORB Lightweight Naming

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

SERVICE

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

CHAPTER

1 Basic Concepts

This section describes the basic concepts and architecture of the OMG's Lightweight Naming Service as defined in the OMG's Lightweight Services Specification.



The OMG's Lightweight Naming Service is a sub-set of the full OMG Naming Service Specification. The Lightweight Specification omits features which are considered not to be essential in a restricted environment. The purpose of this is to reduce footprint size and enable the service to be deployed on memory or storage constrained platforms. The features provided by the Lightweight Naming Service only include those defined as part of the `NamingContext` interface. The features of this interface are described under Section 2, *Specific Features*, on page 11.

1.1 OMG Standard Features

The Lightweight Naming Service has the ability to:

- give meaningful names to objects (*name bindings*)
- allow objects, which have been bound to names, to be easily found (*resolve*)
- organise names in logical hierarchies (*naming contexts*)

1.1.1 Names

The Naming Service associates meaningful names with objects. These names can be used to retrieve or reference the object, or in other words, obtain the object's IOR. An association between a name and an object is known as a *name binding*.

A *Naming Service name* is an object in its own right. A name contains a sequence of one or more *name components*. A name component has two string-type attributes, *id* and *kind*. The id and kind attributes identify the name.

A name contains a sequence of one or more name components. A name with a single name component is called a *simple name*. A name which contains a sequence of two or more name components is called a *compound name*. Compound names are used to access name bindings when they are in a hierarchy of *naming contexts*, described below.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

A name binding is held in or otherwise associated with a *naming context*. A name binding cannot exist outside of a naming context. Names are bound to naming contexts, as well as to objects. It is possible to have orphaned contexts if the name binding is removed without keeping a reference to the context being unbound.

An object can be bound to one or more names, but a name can only be bound to one object. If an object is bound to more than one name, then any of those names can be used to locate the object.

Resolving is the process of locating an object or naming context by using its name.

1.1.2 Naming Contexts

A naming context is an object which contains name bindings. Each name in a given naming context must be unique, in other words, the combination of a name's name component *id* and *kind* values must be unique. The name can be used in other naming contexts.

Naming hierarchies can be created by binding a naming context to another naming context. A simple naming context hierarchy is shown in *Figure 1*. Names in a naming context can refer to other naming contexts as well as to objects. A hierarchy of naming contexts is called a *naming graph*.

The top level of the naming graph is called the *root context*. The root context is also the default context, that is, it does not need to be explicitly created whereas all other contexts, *child contexts* of the root context, must be explicitly created.

Objects, and contexts themselves, are referenced by following the hierarchy of naming contexts, starting from the root context and ending with the desired object or naming context. Technically, the object or context can be referenced in one of two ways:

1. Obtain an object reference to the context which contains the required object or context. The object's name can then be used to obtain the object's IOR.
2. Construct a compound name which contains a sequence of name components, where each name component identifies each successive naming context in the naming graph and where the last name component identifies the required object or context.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

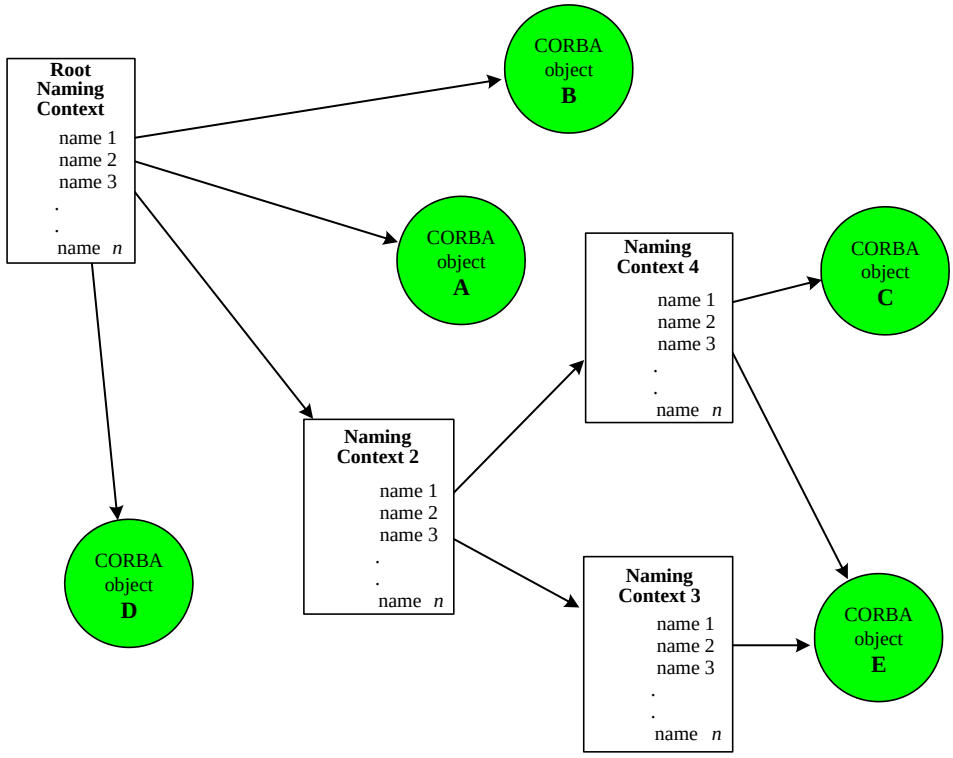


Figure 1 Example Naming Graph

For example, in *Figure 1* objects *A*, *B* and *NamingContext2* are bound directly to the root context: they can be referenced using a simple name (containing the name component which identifies the objects themselves). Objects *C* and *E* are bound to child contexts lower down the hierarchy: in order to access objects *C* and *E* from the root context, the name component for each successive naming context must be provided as a compound name. For example, the compound name for referencing object C from the root context will contain a sequence which looks like this in pseudo-code:

```
name[0] = NamingContext2.nameComponent
name[1] = NamingContext4.nameComponent
name[2] = C.nameComponent
```

The root context is always implicit in a compound name; a special operation, `resolve_initial_references`, is performed once to obtain the root context, and all subsequent `resolve` operations depend on that.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

CHAPTER

2 Specific Features

The Spectra ORB Lightweight Naming Service's features are described below. As mentioned previously, the service conforms to the OMG's Lightweight Services Specification and is a subset of the full OMG Naming Service Specification.

The Spectra ORB Lightweight Naming Service supports a subset of the `NamingContext` *interface.*

The interfaces, datatypes, methods and exceptions supported by the Spectra ORB Lightweight Naming Service are listed below.

Interfaces and Datatypes

- `Name` (datatype)
- `NameComponent` (datatype)
- `NamingContext` (interface)

NamingContext Methods

- `bind()`
- `rebind()`
- `resolve()`
- `unbind()`
- `bind_new_context()`
- `destroy()`

NamingContext Exceptions

- `NotFoundReason`
- `NotFound`
- `CannotProceed`
- `InvalidName`
- `AlreadyBound`
- `NotEmpty`



The *`BindingIterator`* or *`NamingContextExt`* interfaces are not supported by the Lightweight Naming Service.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.1 Naming Context Creation and Destruction

The `NamingContext` interface provides a `NamingContext` creation operation and a destroy operation, defined in IDL as:

```
NamingContext bind_new_context (in Name n)
   raises (NotFound, CannotProceed, InvalidName,
              AlreadyBound);

void destroy () raises (NotEmpty);
```

The `bind_new_context` operation creates a new Naming Context and binds it using the supplied name.

The `destroy` operation requests the destruction of a `NamingContext` object. The naming context must be empty. After `destroy` is invoked, no further operations can be invoked on the object reference of the naming context object.



Bindings to a destroyed context are not removed. To do so would require a context to know about all of its parents as well as its children. An attempt to resolve a binding to a destroyed context will throw the `CORBA.INV_OBJREF` exception. Accordingly, bindings to a naming context should be removed before it is destroyed.

When a hierarchical name is used to create a new context, all the contexts that constitute the path to the new context must already exist or the *`NotFound`* exception will be raised

2.2 Object Binding and Unbinding Operations

The `NamingContext` interface provides the following object binding and unbinding operations, defined in IDL as:

```
void bind (in Name n, in Object obj)
   raises (NotFound, CannotProceed, InvalidName,
AlreadyBound);

void rebind (in Name n, in Object obj)
   raises (NotFound, CannotProceed, InvalidName);

void unbind (in Name n)
   raises (NotFound, CannotProceed, InvalidName);
```

The bind operations allow binding to occur between a name and either a generic CORBA object or a Naming Context. In order to bind a CORBA object, the name to bind against must be correctly constructed. Given a name with *n* components, the first *n - 1* components must resolve to a bound `NamingContext`.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

The `rebind` operation is identical to the `bind` operation except that the `AlreadyBound` exception is not thrown; an existing binding with the same name is replaced by the new binding.

2.3 Accessing Objects and Naming Contexts

The resolve operation is used to obtain the object references of naming contexts and named objects, defined in IDL as:

```
Object resolve (in Name n)
   raises (NotFound, CannotProceed, InvalidName);
```

The `resolve` operation takes a name and returns the object, if any, bound to that name.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

CHAPTER

3 Using the Service

*This section describes the specific procedures and requirements for creating and running CORBA-based applications with the Spectra ORB Lightweight Naming Service C++ Edition. (Please note that this section is **not** intended as a tutorial of how to write CORBA-based applications with the Naming Service.)*

3.1 Running the Service

The Naming Service instances can be run from the command line or by embedding into application or module code. Instructions for running the service using these methods is described in the following sections, *Embedding the Service*, below, and *Running from the Command Line* on page 19.

3.1.1 Embedding the Service



Refer to the *Platforms* section of the *User Guide* for specific compiler and linking details for your platform.

The following basic tasks must be performed in order to embed a Naming Service into an executable or code module:

Step 1: Include the following *`#include`* statements in your code:

```
#include "CosNaming.h"
#include "eOrb/EORB/NamingService.h"
```

i Ensure your build system has *`$(EORBHOME)/include/eOrb/services/lw`* on its include path.

Step 2: When compiling and linking instruct the linker to link the *`e_lwnaming_s.lib`* library file.

Step 3: Configure the service instance by setting the property fields in the naming service's configuration structure: these properties are used to determine specific aspects of your instance's behaviour and are described later.

Step 4: Initialise a Naming Service instance by using the Naming Service's *`init()`* method:

```
root_ctx = EORB::NamingService::init(orb, poa, config)
```

where:

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

orb is the orb which the service is to be run on
poa is the POA which the service is to run in (see *POA Argument Choices* below)
config is the service instance's configuration (see *Configuration Structure* below)

3.1.1.1 POA Argument Choices

The *poa* agrument allows the user to create their own poa for the Naming Service that has properties configured to meet the demands of their system or implementation.

There are two choices for the poa argument: `NULL` or User Defined POA

1. NULL

   In this case the `EORB::NamingService` will create a POA where:

   id assignment policy is set to *PortableServer::USER_ID*
   id_uniqueness_policy is set to *PortableServer::MULTIPLE_ID*

   lifespan_policy is set to *PortableServer::PERSISTENT* if the `config` option *qosPersistent* is set to `TRUE`, otherwise it will be set to *PortableServe::TRANSIENT*

2. User Defined POA

   The User Defined POA ***MUST*** have the following policies set:

   id assignment policy set to *PortableServer::USER_ID*
   id_uniqueness_policy set to *PortableServer::MULTIPLE_ID*

   The `config` option *qosPersistent* will be ignored when a user defined POA is provided. If persistence is required, then the appropriate policies must be set on the user defined POA.

   All other policies can be set as needed.

3.1.1.2 Configuration Structure

The structure mentioned in *Step 3:* above defines the property fields described below in Table 1, *Configuration Property Descriptions*. An example of setting the configuration structure fields is shown in Example 1, *Setting the Configuration Structure Fields*, on page 17.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Table 1 Configuration Property Descriptions

Property	Description
`qosContextLocking`	Controls the read and write locking protection for concurrent access to naming contexts. *`qosContextLocking`* should normally only be set to *`false`*, unlocked, when the service is used in read-only mode. The default is *`true`*, locked.
`qosMaxContexts`	The number of naming contexts that this service instance is expected to create. The default value is *1024*.
`qosPersistent`	Creates a persistent IOR for the Naming Service and causes it to listen on a fixed port. This enables the Naming Service to always be resolved using the same IOR or CORBALOC, even when the service has been shutdown and restarted.

Example 1 Setting the Configuration Structure Fields

```
EORB::NamingService::Config config;
config.qosMaxContexts = 500;
```

3.1.1.3 Example Server Module

The following example code shows how a Naming Service instance can be created with the default Naming Service POA.

```
#include "eorb_name_i.h"
#include "eOrb/EORB/NamingService.h"

EORB_MAIN (server)
{
   EORB_DECLARE_ENV;

   eorb_name_impl * servant = 0;
   EORB::NamingService::Config config;
   config.qosMaxContexts = 11;
   config.qosPersistent = 0;

   EORB::Plugin::Current::add ();
   EORB::Plugin::IIOP::add ();
   EORB::Plugin::POA::add ();

   EORB_Stdio_plugin ();
   EORB_File_plugin ();

   EORB_TRY
   {
      printf ("Naming server starting\n");
```


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
      // Naming Service setup

      CosNaming::NamingContext_var ctx;
      PortableServer::POA_var poa;
      PortableServer::POA_var child_poa;
      PortableServer::ObjectId_var oid;
      CORBA::Object_var obj;
      CORBA::ORB_var orb;

      orb = CORBA::ORB_init (argc, argv EORB_ENV_VARN);
      EORB_CHECK_ENV;

      // Get the RootPOA

      obj = orb->resolve_initial_references ("RootPOA"
EORB_ENV_VARN);
      EORB_CHECK_ENV;

      poa = PortableServer::POA::_narrow (obj EORB_ENV_VARN);
      EORB_CHECK_ENV;

      // Create servant and activate it

      servant = new eorb_name_impl (orb EORB_ENV_VARN);
      EORB_CHECK_ENV;

      oid = poa->activate_object (servant EORB_ENV_VARN);
      EORB_CHECK_ENV;

      EORBTest::name_var server = servant->_this (EORB_ENV_VAR1);
      EORB_CHECK_ENV;

      // Initialise a naming service

      ctx = EORB::NamingService::init
      (
         orb,
         NULL,
         config
         EORB_ENV_VARN
      );
      EORB_CHECK_ENV;

      orb->register_initial_reference ("NameService", ctx
EORB_ENV_VARN);
      EORB_CHECK_ENV;

      orb->register_initial_reference ("server", server
EORB_ENV_VARN);
      EORB_CHECK_ENV;

      printf ("Name Service started...\n");

      orb->run (EORB_ENV_VAR1);
      EORB_CHECK_ENV;

      orb->destroy (EORB_ENV_VAR1);
      EORB_CHECK_ENV;
   }
   EORB_CATCH (CORBA::Exception, exc)
```


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
    {
       printf ("Exception %s\n", exc._rep_id ());
    }
    EORB_END_TRY

    delete servant;

    printf ("Naming server complete\n");

    return 0;
}
```

3.1.2 Running from the Command Line

An alternative to writing a module which creates and runs a Naming Service server is to run the Spectra ORB Lightweight Naming Service executable, *lwnamingcpp*, from the command line. `lwnamingcpp` is located in the `$EORBHOME/bin/$EORBENV` directory. The `lwnamingcpp` executable can be run with zero or more of the command line options listed below in *Table 2*.

Table 2 Command Line Options

Option	Description
`-NameServiceContextLocking <on|off>`	Sets context locking state (see above) The default is *on*.
`-NameServiceMaxContexts <num>`	Sets the expected number of contexts to be created, The default is *100*.
`-NameServicePersistent <yes|no>`	Sets whether the lifespan policy is set to `PortableServer::PERSISTENT` or `PortableServer::TRANSIENT` The default is *yes* (= *PERSISTENT*).
`-NameServiceUIOP`	Runs the service on a UIOP endpoint. Only available on systems where UIOP is a supported transport. The default is `no`.

3.1.2.1 Example

The following command line example demonstrates how to start a Naming Service instance, on a UNIX operating system, where:

- the expected number of contexts to be created is *100*

```
%  lwnamingcpp -NameServiceMaxContexts 100
```


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.1.3 Running on a Fixed Endpoint

The server can be run on a fixed endpoint by running with the `-ORBPOAEndpoints` argument. The Name Service servant is created within a child POA *NameService* so for example can be run on a fixed IIOP endpoint with:

```
-ORBPOAEndpoints NameService:iiop:<host>:<port>
```

and resolved as an initial reference by a client using:

```
-ORBInitRef NameService=corbaloc:iiop:<host>:<port>/NameService
```

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

CHAPTER

4 Creating Applications

This section describes how to create client-server applications which use the Spectra ORB Lightweight Naming Service. Topics covered include:

- *clients and servers that use the Naming Service for object resolution*
- *creating and destroying naming contexts*
- *associating objects with name bindings and adding them to naming contexts*
- *resolving objects by using name bindings.*



This release of the Spectra ORB Lightweight Naming Service C++ Edition does ***not*** support the `kind` property of the `CosNaming::NameComponent`. Although the examples shown here use the `kind` property, it is nonetheless ignored by the Service when binding or resolving names.



Note

- For the sake of clarity and brevity, the examples shown here do not have all of the error or exception trapping code normally used. Exceptions and errors must, naturally, be caught and properly handled in a production system.
- Applications which ***use*** the Spectra ORB Lightweight Naming Service must
  - have a `#include "CosNaming.h"` line in the source code file
  - link the `e_lwnaming_cpp.lib` library file
- Applications or modules which ***create and run*** Spectra ORB Lightweight Naming Service instances must also:
  - have a `#include “eOrb/ORB/NamingService.h”` line in the source code file
  - be implemented and configured as described in Section 3, *Using the Service*.

4.1 A Basic Application

A basic client-server application which uses the Spectra ORB Lightweight Naming Service must:

- enable its server and client components to obtain an object reference to a running Spectra ORB Lightweight Naming Service server instance (referred to here as the *naming service* for brevity)
- register objects with the naming service

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

- retrieve or resolve the object registered with the naming service

An example application demonstrates how these tasks can be performed. The application:

- has a server which
  - creates and activates a Spectra ORB Lightweight Naming Service servant
- has a client which
  - obtains a reference to the servant
  - creates and binds contexts and objects with the naming service
  - retrieves bindings using list and iterator methods
  - unbinds objects and contexts
  - destroys contexts

The complete source code for the example application is provided as source files in `examples/cpp/services/naming/lw` below the installation directory.

4.1.1 Registering Objects

The server must make its objects available to clients, in other words, it must provide some mechanism which enables its clients to resolve its objects. It can do this using various methods, such as saving the objects' IORs to a file or by using the naming service (see the Spectra ORB's *User Guide* for other alternatives): the example server uses the naming service.

4.1.1.1 Obtaining the Root Context

The first task which the server must do, aside from creating the objects which clients will use, is to obtain the *root context* of a naming service.

The root context is a normal CORBA object and can be obtained using the standard CORBA methods for object resolution. For this example, a separate module can create a naming service instance and publish its stringified IOR in a file called `NamingService.ior`.[1] The server can use this naming service by retrieving its stringified IOR and converting it to an object reference.

The following example server code initialises the ORB then creates and activates a servant.

4.1.1.2 Example server source code

The complete source code for the supplied example server is shown below:

```
#include "eOrb/EORB/Plugin/Current.h"
```

1. An example module which creates a Naming Service server is shown under *Example Server Module* on page 17.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
#include "eorb_name_i.h"
#include "eOrb/EORB/NamingService.h"

EORB_MAIN (server)
{
   EORB_DECLARE_ENV;

   eorb_name_impl * servant = 0;
   EORB::NamingService::Config config;
   config.qosMaxContexts = 11;
   config.qosPersistent = 0;

   EORB::Plugin::Current::add ();
   EORB::Plugin::IIOP::add ();
   EORB::Plugin::POA::add ();

   EORB_Stdio_plugin ();
   EORB_File_plugin ();

   EORB_TRY
   {
      printf ("Naming server starting\n");

      // Naming Service setup

      CosNaming::NamingContext_var ctx;
      PortableServer::POA_var poa;
      PortableServer::POA_var child_poa;
      PortableServer::ObjectId_var oid;
      CORBA::Object_var obj;
      CORBA::ORB_var orb;

      orb = CORBA::ORB_init (argc, argv EORB_ENV_VARN);
      EORB_CHECK_ENV;

      // Get the RootPOA

      obj = orb->resolve_initial_references ("RootPOA"
EORB_ENV_VARN);
      EORB_CHECK_ENV;

      poa = PortableServer::POA::_narrow (obj EORB_ENV_VARN);
      EORB_CHECK_ENV;

      // Create servant and activate it

      servant = new eorb_name_impl (orb EORB_ENV_VARN);
      EORB_CHECK_ENV;

      oid = poa->activate_object (servant EORB_ENV_VARN);
      EORB_CHECK_ENV;

      EORBTest::name_var server = servant->_this (EORB_ENV_VAR1);
      EORB_CHECK_ENV;

      // Initialise a naming service

      ctx = EORB::NamingService::init
      (
         orb,
```


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
         NULL,
         config
         EORB_ENV_VARN
      );
      EORB_CHECK_ENV;

      orb->register_initial_reference ("NameService", ctx
EORB_ENV_VARN);
      EORB_CHECK_ENV;

      orb->register_initial_reference ("server", server
EORB_ENV_VARN);
      EORB_CHECK_ENV;

      printf ("Name Service started...\n");

      orb->run (EORB_ENV_VAR1);
      EORB_CHECK_ENV;

      orb->destroy (EORB_ENV_VAR1);
      EORB_CHECK_ENV;
   }
   EORB_CATCH (CORBA::Exception, exc)
   {
      printf ("Exception %s\n", exc._rep_id ());
   }
   EORB_END_TRY

   delete servant;

   printf ("Naming server complete\n");

   return 0;
}
```

4.1.1.3 Example client source code

The complete source code for the supplied example client is shown below:

```
#include "CosNaming.h"
#include "eorb_name.h"

void lightweight_naming_examples
(
   CosNaming::NamingContext_ptr root_ctx
   EORB_ENV_ARGN
)
{
   EORB_TRY
   {
      printf ("Binding 10 names into a naming context");

      CORBA::Object_var obj = new CORBA::Object;
      CosNaming::NamingContext_var ctx;
      CosNaming::NameComponent comp;
      CosNaming::Name name (1);
      name.length (1);
      unsigned long i = 0;
```

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
      /* Bind 10 objects into root context, 5 contexts, 5 objects */

      for (i = 0; i < 10; i++)
      {
         char idbuf[32] = "";

         if (i < 5)
         {
            sprintf (idbuf, "context binding #%ld", i);
         }
         else
         {
            sprintf (idbuf, "object binding #%ld", i);
         }

         comp.id = (const char*) idbuf;
         name[0] = comp;

         if (i < 5)  /* bind context */
         {
            ctx = root_ctx->bind_new_context (name EORB_ENV_VARN);
            EORB_CHECK_ENV;

            printf ("Bind new context to name: %s\n", idbuf);
         }
         else  /* bind object */
         {
            root_ctx->bind (name, obj.in () EORB_ENV_VARN);
            EORB_CHECK_ENV;

            printf ("Bind object to name: %s\n", idbuf);
         }
      }

      /* Resolve bindings and unbind objects and contexts, destroy
contexts */
      for (i = 0; i < 10; i++)
      {
         char idbuf[32] = "";

         if (i < 5)
         {
            sprintf (idbuf, "context binding #%ld", i);
         }
         else
         {
            sprintf (idbuf, "object binding #%ld", i);
         }

         comp.id = (const char*) idbuf;
         name[0] = comp;

         obj = root_ctx->resolve (name EORB_ENV_VARN);
         EORB_CHECK_ENV;

         printf ("Resolve binding: %s\n", idbuf);

         root_ctx->unbind (name EORB_ENV_VARN);
         EORB_CHECK_ENV;
```


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
         printf ("  Unbind from name: %s\n", idbuf);

         if (i < 5)
         {
            ctx = CosNaming::NamingContext::_narrow (obj.in ()
EORB_ENV_VARN);
            EORB_CHECK_ENV;

            printf ("  Narrow object to context");

            ctx->destroy(EORB_ENV_VAR1);
            EORB_CHECK_ENV;

            printf ("  Destroy context");
         }
      }

   }
   EORB_CATCH (CORBA::Exception, exc)
   {
      printf ("Exception: %s\n", exc._rep_id ());
   }
   EORB_END_TRY
}


EORB_MAIN (client)
{
   EORB_DECLARE_ENV;

   CORBA::ORB_var orb;
   CORBA::Object_var obj;
   CosNaming::NamingContext_var root;
   EORBTest::name_var example;

   EORB::Plugin::IIOP::add ();

   EORB_TRY
   {
      printf ("Naming LW client starting\n");

      orb = CORBA::ORB_init (argc, argv EORB_ENV_VARN);
      EORB_CHECK_ENV;

      obj = orb->resolve_initial_references ("NameService"
EORB_ENV_VARN);
      EORB_CHECK_ENV;
      root = CosNaming::NamingContext::_narrow (obj EORB_ENV_VARN);
      EORB_CHECK_ENV;

     obj = orb->resolve_initial_references ("server" EORB_ENV_VARN);
      EORB_CHECK_ENV;
      example = EORBTest::name::_narrow (obj EORB_ENV_VARN);
      EORB_CHECK_ENV;

      lightweight_naming_examples (root EORB_ENV_VARN);
      EORB_CHECK_ENV;

      root->destroy (EORB_ENV_VAR1);
      EORB_CHECK_ENV;
```

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
      example->shutdown (EORB_ENV_VAR1);
      EORB_CHECK_ENV;

      orb->destroy (EORB_ENV_VAR1);
      EORB_CHECK_ENV;
   }
   EORB_CATCH (CORBA::Exception, exc)
   {
      printf ("Exception: %s\n", exc._rep_id ());
   }
   EORB_END_TRY

   printf ("Naming LW client complete\n");

   return 0;
}
```

The example client first obtains the root context of the naming service, resolves the initial reference to the example server, and binds in five new contexts and five objects. It then resolves the bindings and unbinds and destroys them.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

CHAPTER

5 Supplemental Information

5.1 Exceptions

The exceptions raised by the Spectra ORB Lightweight Naming Service are listed in *Table 3*.

Table 3 Spectra ORB Lightweight Naming Service Exceptions

Name	Purpose
`AlreadyBound`	Indicates an object is already bound to the specified name. Only one object can be bound to a particular name in a context.
`CannotProceed`	Indicates that the implementation has given up for some reason. The client, however, may be able to continue the operation at the returned naming context. One possible reason for this exception is that a Name Server holding one or more of the name bindings within a compound name is currently unavailable.
`InvalidName`	Indicates that the name is invalid. This implementation disallows zero length names only.
`NotEmpty`	Indicates that a naming context has bindings.
`NotFound`	Indicates that the name does not identify a binding or that the binding is not of the type required for the requested operations.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

APPENDICES

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Appendix

A Examples' Source Code

Code examples shown in this Guide are taken from an example application which is supplied with the product. The example application is supplied as source files in `examples/cpp/services/naming` below the installation directory.



This release of the Spectra ORB Lightweight Naming Service does ***not*** support the `kind` property of the `CosNaming::NameComponent`. Although the supplied examples use the `kind` property, it is nonetheless ignored by the Service when binding or resolving names.

This supplied code is for demonstration and educational purposes ***only***: users should ascertain for themselves the code's suitability and usability. It is expected that users will need to make changes to the source code to suit their particular platform and configuration.

The examples do not have all of the error or exception trapping code normally used, for the sake of clarity and brevity. Exceptions and errors must, naturally, be caught and properly handled in a production system.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Index

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Index

C

Configuration Structure 16

E

Embedding the Service 15
Example 19
Example Server Module 17
Exceptions 29

I

Interfaces and Datatypes 11

N

Naming Context 8
Naming Contexts 8
Naming Service
  Contexts 8
  example
    naming context contents, accessing 13
  Naming context 8
NamingContext Exceptions 11
NamingContext Methods 11
Note 21

O

OMG Standard Features 7

R

Running from the Command Line 19

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

PRISMTECH
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000