



Artix™ ESB

IBM Tivoli Integration Guide

Version 5.1, December 2007

IONA Technologies PLC and/or its subsidiaries may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this publication. Except as expressly provided in any written license agreement from IONA Technologies PLC, the furnishing of this publication does not give you any license to these patents, trademarks, copyrights, or other intellectual property. Any rights not expressly granted herein are reserved.

IONA, IONA Technologies, the IONA logo, Orbix, High Performance Integration, Artix, FUSE, and Making Software Work Together are trademarks or registered trademarks of IONA Technologies PLC and/or its subsidiaries.

Java and J2EE are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries. CORBA is a trademark or registered trademark of the Object Management Group, Inc. in the United States and other countries. All other trademarks that appear herein are the property of their respective owners.

IONA Technologies PLC makes no warranty of any kind to this material including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. IONA Technologies PLC shall not be liable for errors contained herein, or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

COPYRIGHT NOTICE

No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, photocopying, recording or otherwise, without prior written consent of IONA Technologies PLC. No third party intellectual property right liability is assumed with respect to the use of the information contained herein. IONA Technologies PLC assumes no responsibility for errors or omissions contained in this book. This publication and features described herein are subject to change without notice.

Copyright © 2001-2008 IONA Technologies PLC. All rights reserved.

All products or services mentioned in this manual are covered by the trademarks, service marks, or product names as designated by the companies who market those products.

Updated: July 7, 2008

Contents

List of Figures	5
Preface	7
What is covered in this book	7
Who should read this book	7
Organization of this book	7
The Artix Documentation Library	8
Chapter 1 Integrating with IBM Tivoli™	9
Introduction	10
The IONA Tivoli Integration	13
Chapter 2 Configuring your IONA Product	17
Setting up your Artix Environment	18
Setting up your Orbix Environment	20
Chapter 3 Configuring your Tivoli Environment	25
Creating a Tivoli Installation Bundle	26
Installing the Resource Model in the Tivoli Server	28
Pushing the Resource Model out to your Host	32
Configuring the Resource Model for your Endpoint	34
Chapter 4 Extending to a Production Environment	37
Configuring an Artix Production Environment	38
Configuring an Orbix Production Environment	42
Chapter 5 Using the IONA Tivoli Integration	47
Detecting Common Server Problems	48
Tracking Server Performance Metrics	50
Stopping, Starting, and Restarting Servers	51

CONTENTS

Appendix A IONA Tivoli Resource Model	53
Thresholds	54
Events	56
Parameters	57
WBEM/CIM Definition	58
Index	61

List of Figures

Figure 1: Overview of the IONA Tivoli Integration	12
Figure 2: Example IONA Tivoli Deployment	15
Figure 3: Orbix Configuration GUI	20
Figure 4: Selecting Tivoli Agent Configuration	21
Figure 5: Selecting Performance Logging	22
Figure 6: Tivoli Profile Manager	29
Figure 7: Edit Resource Model	30
Figure 8: Contents of the IONA Server Task Library	33
Figure 9: The <code>configure_provider</code> Task	39
Figure 10: The <code>configure_provider</code> Task	44

LIST OF FIGURES

Preface

What is covered in this book

IONA's products support integration with Enterprise Management Systems such as IBM Tivoli™, BMC Patrol™, and CA WSDM™. This book explains how to integrate Artix and Orbix with IBM Tivoli.

Who should read this book

This book is aimed at system administrators using IBM Tivoli to manage distributed enterprise environments, and developers writing distributed enterprise applications. Administrators do not require detailed knowledge of the technology that is used to create distributed enterprise applications.

This book assumes that you already have a good working knowledge of the IBM Tivoli Management Framework and IBM Tivoli Monitoring (formerly known as Distributed Monitoring).

Organization of this book

This book contains the following chapters:

- [Chapter 1](#) introduces Enterprise Management Systems, and IONA's integration with IBM Tivoli.
- [Chapter 2](#) describes how to configure your IONA product for integration with IBM Tivoli.

- [Chapter 3](#) describes how to configure your IBM Tivoli environment for integration with IONA products.
- [Chapter 4](#) describes how to extend your integration from a test environment into a production environment.
- [Chapter 5](#) explains how to perform common tasks such as tracking server metrics or starting a server.
- [Appendix A](#) lists the contents of the IONA Tivoli resource model, describing its thresholds, events and parameters.

The Artix Documentation Library

For information on the organization of the Artix library, the document conventions used, and where to find additional resources, see [Using the Artix Library](#).

Integrating with IBM Tivoli™

This chapter introduces the integration of IONA products with the IBM Tivoli™ Enterprise Management System (EMS).

In this chapter

This chapter contains the following sections:

Introduction	page 10
The IONA Tivoli Integration	page 13

Introduction

Overview

IONA's products support integration with Enterprise Management Systems such as IBM Tivoli. This section includes the following topics:

- [“The application life cycle”](#).
 - [“Enterprise Management Systems”](#).
 - [“IONA EMS integration”](#).
 - [“IONA Tivoli integration tasks”](#).
 - [“Integration overview”](#).
-

The application life cycle

Most enterprise applications go through a rigorous development and testing process before they are put into production. When applications are in production, developers rarely expect to manage those applications. They usually move on to a new project while the day-to-day running of the applications are managed by a production team. In some cases, the applications are deployed in a data center that is owned by a third party, and the team that monitors the applications belong to a different organization.

Enterprise Management Systems

Different organizations have different approaches to managing their production environment, but most will have at least one *Enterprise Management System* (EMS).

For example, the main Enterprise Management Systems include IBM Tivoli and BMC Patrol™. These systems are popular because they give a top-to-bottom view of every part of the IT infrastructure. This means that if an application fails because the `/tmp` directory fills up on a particular host, for example, the disk space is reported as the fundamental reason for the failure. The various application errors that arise are interpreted as symptoms of the underlying problem with disk space. This is much better than being swamped by an event storm of higher level failures that all originate from the same underlying problem. This is the fundamental strength of integrated management.

IONA EMS integration

IONA's Orbix and Artix products are designed to integrate with Enterprise Management Systems. IONA's common management instrumentation layer provides a base that can be used to integrate with any EMS.

In addition, IONA provides packaged integrations that provide out-of-the-box integration with major EMS products. This guide describes IONA's integration with the IBM Tivoli products.

IONA Tivoli integration tasks

The IONA Tivoli integration performs key enterprise management tasks (for example, posting an event if a server dies). This enables automated recovery actions to be taken.

The IONA Tivoli integration also tracks key server metrics (for example, number of invocations received; and average, maximum and minimum response times). Events can be generated when any of these parameters go out of bounds.

In addition, you can also perform an extensible set of actions on servers. The default actions are start, stop and restart.

Integration overview

In the IONA Tivoli integration, these key server performance metrics are logged by the IONA performance logging plugins. Log file interpreting utilities are then used to analyze the logged data. [Figure 1](#) shows a simplified overview of the IONA Tivoli integration at work. In this example, a restart command is issued to an unresponsive server (for example, locator or naming service).

The IONA performance logging plugins collect data relating to server response times and log it periodically in the performance logs. The IONA Tivoli resource model executes periodically on each host and uses the IONA log file interpreter to collect and summarize the logged data. It compares the response times and other values against user defined thresholds. If these values exceed the threshold, an event is fired. This event can be used to trigger an option from the Tivoli task library to restart the unresponsive server.

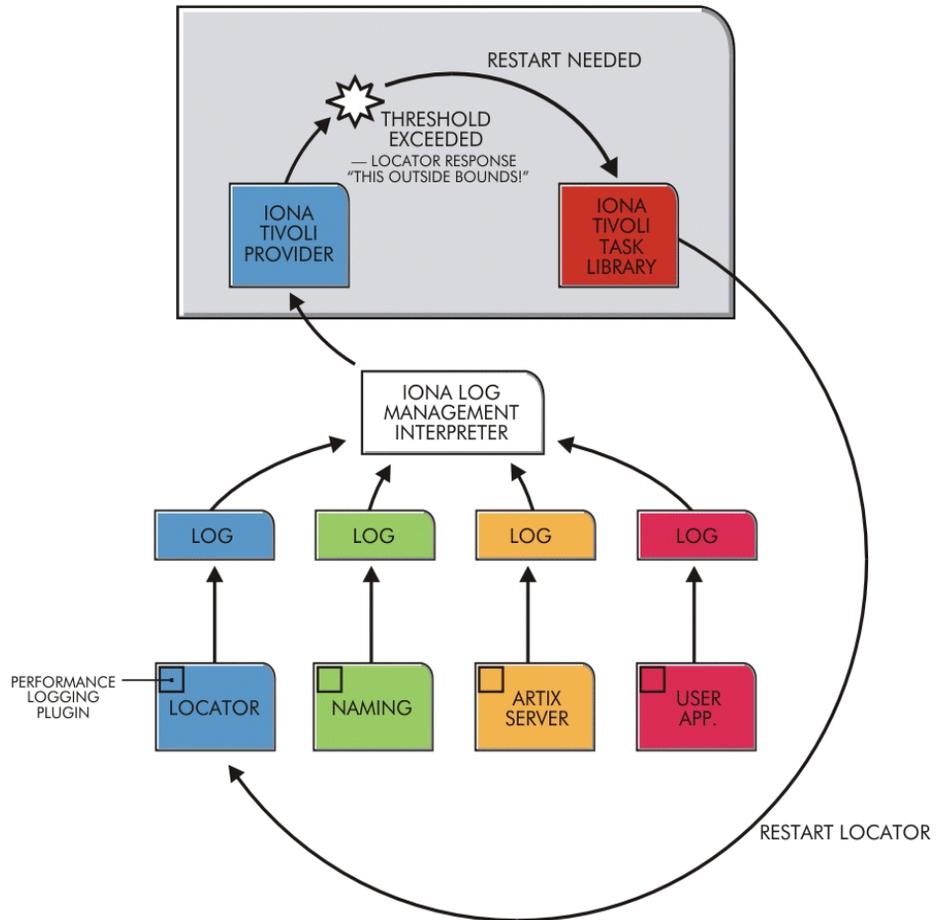


Figure 1: Overview of the IONA Tivoli Integration

The IONA Tivoli Integration

Overview

This section describes the requirements and main components of IONA's Tivoli integration. This section includes the following topics:

- [“IONA requirements”](#).
 - [“Tivoli requirements”](#).
 - [“Main components”](#).
 - [“IONA Tivoli resource model”](#).
 - [“IONA Tivoli task library”](#).
 - [“Integration and setup utilities”](#).
 - [“Example IONA Tivoli deployment”](#).
-

IONA requirements

IONA's Artix and Orbix products are fully integrated with IBM Tivoli. You must have at least one of the following installed:

- Artix 2.0.1 or higher.
 - Orbix 6.1 or higher.
-

Tivoli requirements

IONA's products are fully integrated with IBM Tivoli Management Framework and IBM Tivoli Monitoring.

To use the IONA Tivoli integration, you must have at least the following versions installed:

- IBM Tivoli Management Framework 4.1 or higher.
 - IBM Tivoli Monitoring 5.1.1 (Fix Pack 04) or higher.
-

Main components

The IONA Tivoli integration package contains three main parts:

- A Tivoli Monitoring resource model.
- A Tivoli task library.
- Integration and setup utilities.

IONA Tivoli resource model

For an introduction to Tivoli resource models, see the IBM *Tivoli Monitoring User Guide*. The IONA Tivoli resource model enables Tivoli to track key attributes of Artix and Orbix services and customer-built servers that are based on Artix and Orbix. These attributes include:

- Server liveness.
- Number of incoming invocations received by the server.
- Maximum, average, and minimum response times of the server.

The resource model defines events that fire when a server's liveness cannot be verified, or when any of the other attribute values go beyond thresholds that can be set by the user.

The IONA Tivoli resource model is described in detail in [Appendix A](#).

IONA Tivoli task library

The IONA Tivoli task library contains a set of tasks that can be used to configure and check the IONA Tivoli integration.

This task library can also be used to start, stop, or restart monitored servers. It can also be extended to perform any number of actions on a monitored server. These actions can be performed automatically as a result of receiving an event. For example, if an event fires to indicate that a server is no longer alive, you can configure Tivoli to use the IONA Tivoli task library to issue a restart for that server.

Integration and setup utilities

Both the IONA Tivoli resource model and task library must be installed and configured to work correctly. The IONA Tivoli integration package contains a number of setup utilities that help you achieve this task. These utilities are described in detail in [“Configuring your Tivoli Environment” on page 25](#).

Example IONA Tivoli deployment

The high-level overview in [Figure 2](#) shows a typical deployment of an IONA Tivoli integration. This deployment is explained as follows:

1. The IONA Tivoli resource model and task library are installed on the Tivoli region server.
2. The administrator customizes a monitoring profile based on the IONA Tivoli resource model.
3. The monitoring profile is distributed through the gateways to each of the Tivoli endpoints (managed hosts). In this example, there are three Tivoli endpoints—two based on Windows, and one on Solaris.

- The monitoring profile executes inside the Tivoli Monitoring Agent, periodically checking the status and response times of the IONA services and IONA-based applications.

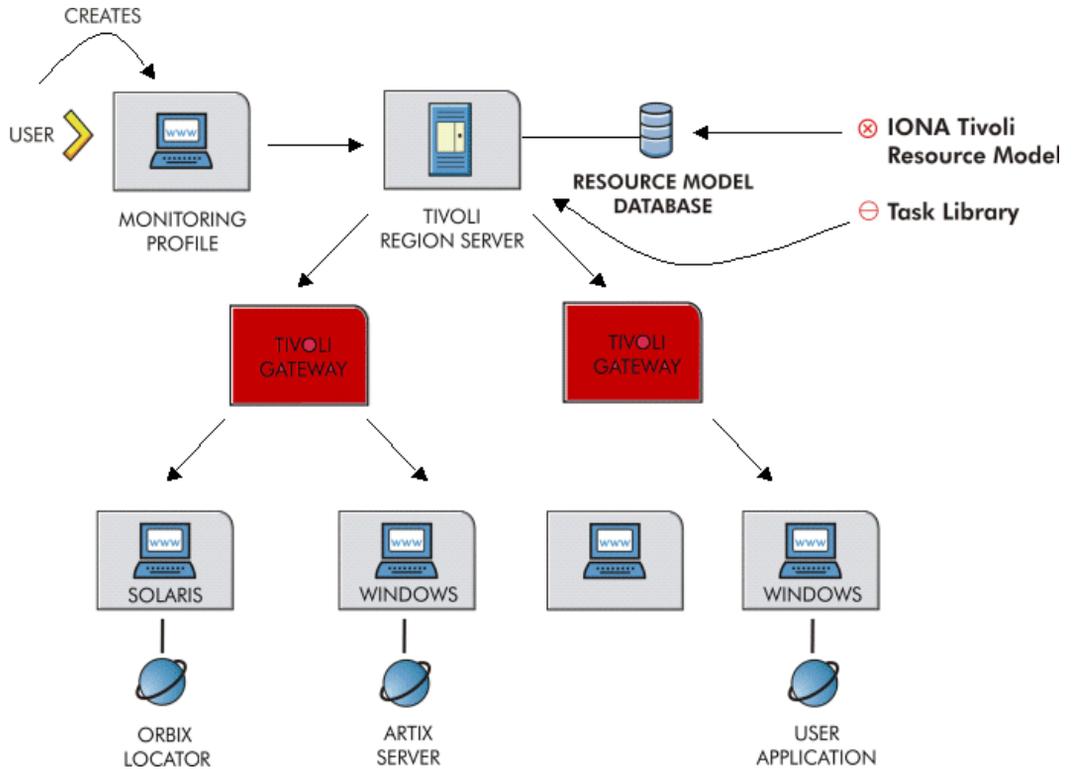


Figure 2: Example IONA Tivoli Deployment

These steps are explained in more detail in [“Configuring your Tivoli Environment”](#) on page 25 and [“Extending to a Production Environment”](#) on page 37.

Configuring your IONA Product

This chapter explains the steps that you need to perform in Artix or Orbix so that they can be managed using IBM Tivoli.

In this chapter

This chapter contains the following sections:

Setting up your Artix Environment	page 18
Setting up your Orbix Environment	page 20

Setting up your Artix Environment

Overview

The best way to learn how to use the IONA Tivoli integration is to start with a host that has both Tivoli and Artix installed. This section explains the configuration steps in your Artix environment. It includes the following topics:

- [“EMS configuration files”](#).
- [“The servers.conf file”](#).
- [“The server_commands.txt file”](#).
- [“Stopping Artix applications on Windows”](#).
- [“Further information”](#).

EMS configuration files

You must create the following two text files to configure the Tivoli integration:

- `servers.conf`
- `server_commands.txt`

These files are used to track your Artix applications in Tivoli, and should be stored for later use (for example, `c:\iona\artix\my_ems_files`).

Creating a servers.conf file

The `servers.conf` file is used to instruct Tivoli to track your Artix servers. It contains the locations of performance log files for specified servers. Each entry must take the following format:

```
myapplication, 1, /path/to/myproject/log/myapplication_perf.log
```

This example entry instructs Tivoli to track the `myapplication` server, and reads performance data from the following log file:

```
/path/to/myproject/log/myapplication_perf.log
```

You must add entries for the log file of each Artix server on this host that you wish Tivoli to track. Tivoli uses the `servers.conf` file to locate these log files, and then scans the logs for information about the server's key performance indicators.

Creating a server_commands.txt file

The `servers.conf` file is used to instruct Tivoli how to start, stop, and restart your Artix servers. It contains the locations of the relevant scripts for specified servers. Each entry must take the following format:

```
myapplication,start=/path/to/myproject/bin/start_myapplication.sh
myapplication,stop=/path/to/myproject/bin/stop_myapplication.sh
myapplication,restart=/path/to/myproject/bin/restart_myapplication.sh
```

In this example, each entry specifies a script that can be used to stop, start, or restart the `myapplication` server. When the IONA Tivoli task library receives an instruction to start `myapplication`, it looks up the `server_commands.txt` file, and executes the script specified in the appropriate entry.

You must add entries that specify the relevant scripts for each server on this host that you wish Tivoli to track.

Stopping Artix applications on Windows

On Windows, stop scripts are not generated by default. While it is straightforward to terminate a process on UNIX by sending it a kill signal, there is no straightforward equivalent on most Windows platforms.

On Windows XP, you can use the `taskkill` command in your stop scripts. On older versions of Windows, you can write your own stop scripts based on a variety of methods. There are many options for implementing a stop script including adding a Web service interface to control the shutdown of your server, or simply making use of a utility such as `pskill` from www.sysinternals.com.

See also, the following article on the Microsoft support pages:

[How to terminate an application cleanly in Win32](http://support.microsoft.com/default.aspx?scid=kb;EN-US;q178893)

(<http://support.microsoft.com/default.aspx?scid=kb;EN-US;q178893>)

Further information

For details of how configure Artix servers to use the performance logging, see [“Configuring an Artix Production Environment” on page 38](#).

For a complete explanation of performance logging configuration, see [Configuring and Deploying Artix Solutions](#).

Setting up your Orbix Environment

Overview

The best way to learn how to use the IONA Tivoli integration is to start with an Orbix installation on a host that is also a Tivoli endpoint. This section explains the configuration steps in your Orbix environment. It includes the following:

- “Creating an Orbix configuration domain”.
- “Generating EMS configuration files”.
- “Configuring performance logging”.
- “Tivoli configuration files”.
- “The servers.conf file”.
- “The server_commands.txt file”.
- “Further information”.

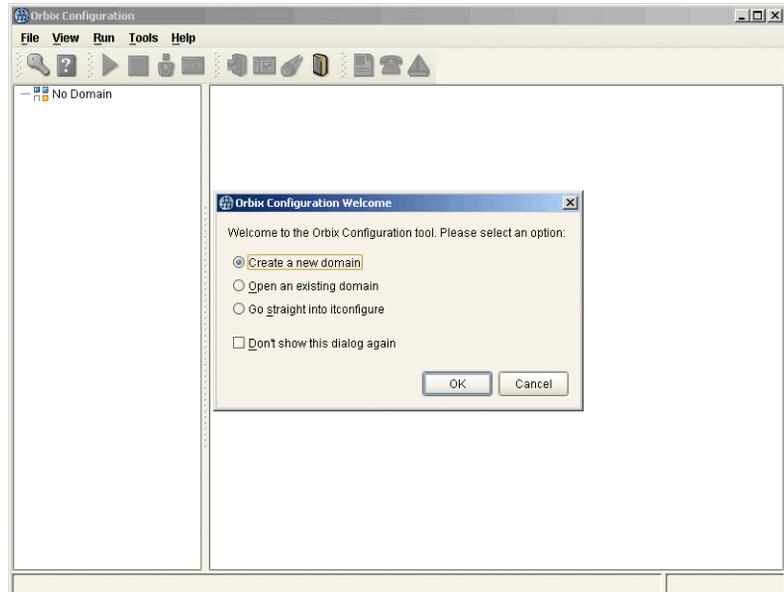


Figure 3: *Orbix Configuration GUI*

Creating an Orbix configuration domain

You must first create the Orbix configuration domain that you want to monitor using the **Orbix Configuration GUI**.

To start the **Orbix Configuration GUI**, enter `itconfigure` on the command line. The first screen is shown in [Figure 3](#).

Generating EMS configuration files

To generate Tivoli agent configuration files, perform the following steps:

1. Click **Go straight into itconfigure** in the welcome dialog.
1. Select **File|New|Expert** from the GUI main menu. This displays the **Domain Details** screen, as shown in [Figure 4](#).
2. Select the **Generate EMS Configuration Files** checkbox. This will generate configuration files required for your IONA Tivoli integration.

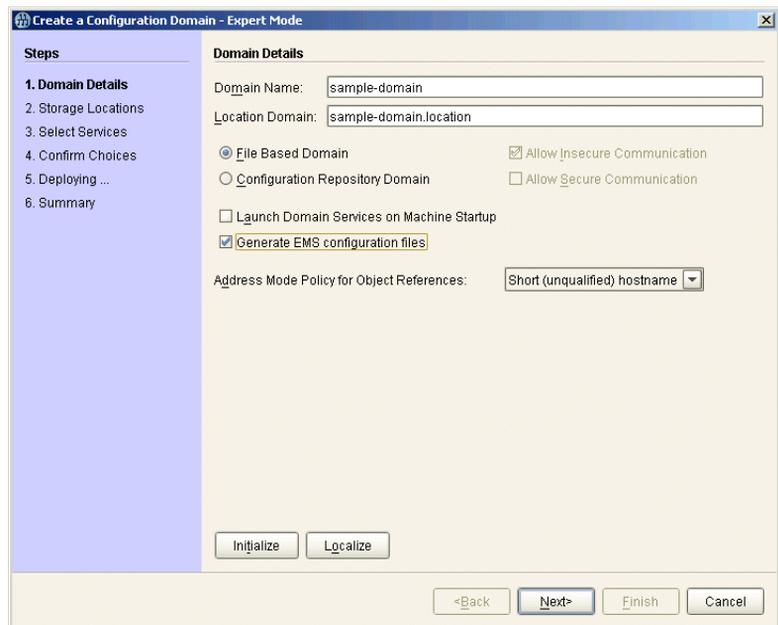


Figure 4: *Selecting Tivoli Agent Configuration*

3. Proceed as normal following the steps in the wizard until you get to the **Select Services** screen (see ["Configuring performance logging"](#)).

Configuring performance logging

To configure performance logging, take the following steps:

1. In the **Select Services** screen, click **Settings** to launch the **Domain Defaults** dialog, shown in [Figure 5](#).
2. Select the **Performance Logging** option in the **Other Properties** box, shown in [Figure 5](#). This ensures that, by default, all your selected services are configured for monitoring.

If you want to enable Tivoli to start, stop, or restart your servers, also select the **Launch Service on Domain Startup** option, in the **Service Launching** box.

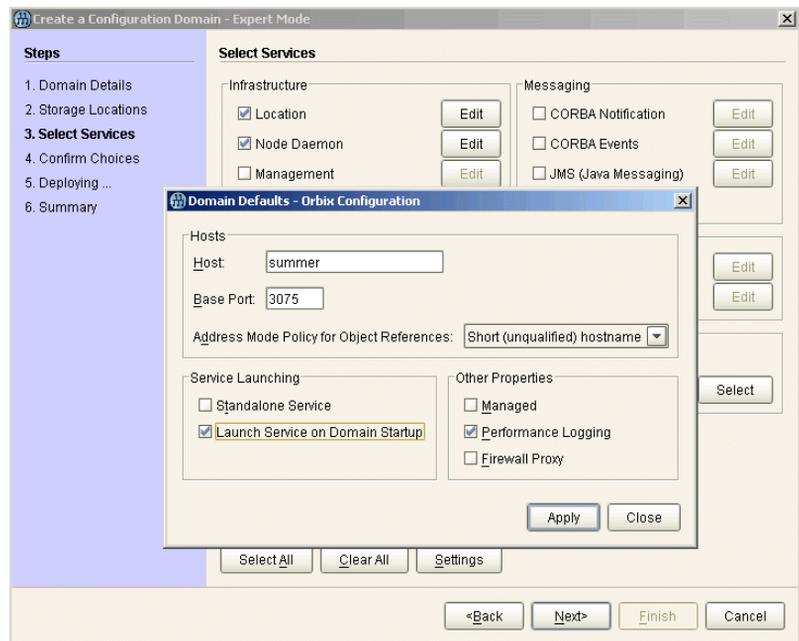


Figure 5: *Selecting Performance Logging*

Alternatively, you can configure these settings separately for each service by selecting the service, and clicking the **Edit** button.

3. Click **Apply**, and then **Close**.

4. Click **Next** to view a **Confirmation** screen for your selected configuration.
5. Click **Next** to deploy your configuration.
6. Click **Finish** to exit.

Note: When configuring Tivoli integration, you must also configure performance logging. This step is not optional. However, you can configure performance logging without Tivoli integration. For full details, see the *Orbix Management User's Guide*.

Tivoli configuration files

When the domain is created, you can start it like any other domain, using the start script in your *OrbixInstall/etc/bin* directory. Selecting the performance logging feature has enabled some extra configuration and logging. In your *OrbixInstall/var/domain-name* directory, you will find the following Tivoli configuration files:

<code>servers.conf</code>	Used by the IONA Tivoli resource model.
<code>server_commands.txt</code>	Used by the IONA Tivoli task library.

The servers.conf file

When you open the `servers.conf` file, you will see a number of entries in the following form:

ServerName, number, /Path/to/a/Log/File

For example:

```
mydomain_locator_myhost, 1,
/opt/iona/var/mydomain/logs/locator_myhost_perf.log
```

The `servers.conf` file lists the servers that you want Tivoli to monitor on a particular host. To begin with, assume that you are running all services in the domain on one host. For example, assume your `servers.conf` file has the above entry. When you have started your domain, you should see a log file in the following location:

```
/opt/iona/var/mydomain/logs/locator_perf.log
```

There will be one of these files for each server that you want to monitor. The IONA Tivoli resource model uses the `servers.conf` file to locate these logs and then scans the logs for information about the server's key performance indicators.

The `server_commands.txt` file

When you open the `server_commands.txt` file, you will see a number of entries of the form:

```
ServerName, Action=/Path/to/Script
```

For example:

```
mydomain_locator_myhost, start
=/opt/iona/var/mydomain/locator_myhost_start.sh
```

Each entry in this file contains a pointer to a script that implements an action on a particular server. In this example, the action is a start action for the server `mydomain_locator_myhost`. When the IONA Tivoli task library receives an instruction to start the locator in a domain named `mydomain` on a host named `myhost`, it looks up the `server_commands.txt` file on `myhost`, and execute the script pointed to in this entry.

Further information

For details of how to manually configure servers to use the performance logging plugins, see [“Extending to a Production Environment” on page 37](#).

For a complete explanation of performance logging configuration, see the *Orbix Management User's Guide*.

Configuring your Tivoli Environment

This chapter explains the steps that you must perform in your IBM Tivoli environment. It assumes that you already have a good working knowledge of the IBM Tivoli Management Framework and IBM Tivoli Monitoring (formerly known as Distributed Monitoring).

In this chapter

This chapter contains the following sections:

Creating a Tivoli Installation Bundle	page 26
Installing the Resource Model in the Tivoli Server	page 28
Pushing the Resource Model out to your Host	page 32
Configuring the Resource Model for your Endpoint	page 34

Creating a Tivoli Installation Bundle

Overview

Your Tivoli integration comes in a `.tar` file called `tivoli_integration.tar`. This file is located in the following directory:

```
ArtixInstallDir\artix_Version\cxx_java\management\Tivoli
```

This section explains how to create a Tivoli install bundle from the `tivoli_integration.tar` file. You will create an install bundle named `tivoli_install.tar`.

Creating an install bundle

To create a Tivoli install bundle, perform the following steps:

1. Untar the `tivoli_integration.tar` file into any directory on the host that you want to monitor, using the following command:

```
tar xvf tivoli_integration.tar
```

There should be three subdirectories:

```
bin
resource-model
task-library
```

2. Go into the `bin` directory and run the `create_tivoli_install_bundle` shell script.

Note: This is a bash script. On Windows (with Tivoli installed), you must use the bash environment that is installed with Tivoli. If you invoke the script with no arguments, it prints out a page of instructions.

The `create_tivoli_install_bundle` script takes the following arguments:

Configuration directory	The configuration directory where the <code>servers.conf</code> and <code>server_commands.txt</code> files are located: Artix For example, <code>c:/my_ems_files</code>). Orbix <i>OrbixInstall/var/DomainName</i> Note: On Windows, you must use a forward slash character (/) when specifying this location.
Region name	The name of the Tivoli administrative region that you want this host/application to be in.
Profile manager	The name of the Tivoli profile manager that you want the IONA profile to be installed in.

- Decide which region to use in your Tivoli deployment, and which profile manager you want the IONA profile to be installed in.
- Run the `create_tivoli_install_bundle` shell script with all three values specified. This results in a new tar file called `tivoli_install.tar`.

Installing the Resource Model in the Tivoli Server

Overview

This section explains how to install the IONA Tivoli resource model from the `tivoli_install.tar` file that you created.

Installing the IONA Tivoli resource model

To install the IONA Tivoli resource model and task library into your Tivoli server, perform the following steps:

1. Transfer the `tivoli_install.tar` file to your Tivoli region server, and untar it to a temporary location, using the following command:

```
tar xvf tivoli_install.tar
```

2. Start a Tivoli shell environment (see your Tivoli documentation for details). On Windows, type `bash`, to run in a bash shell. Change to your temporary location, and you will see a new directory structure starting with a directory named `iona`.
3. Change directory into `iona/bin`. This contains the following shell scripts:

```
import_tll.sh  
create_profile.sh
```

4. Run the `create_profile.sh` script. This adds the IONA Tivoli resource model to the resource model database and creates a new profile named `IONAProfile`.
5. Open the Tivoli **Desktop** and select the region that you specified when you created the install bundle, followed by the profile manager that you specified. In the **Profile Manager** GUI, you will see a new profile called `IONAProfile`, as shown in [Figure 6](#).

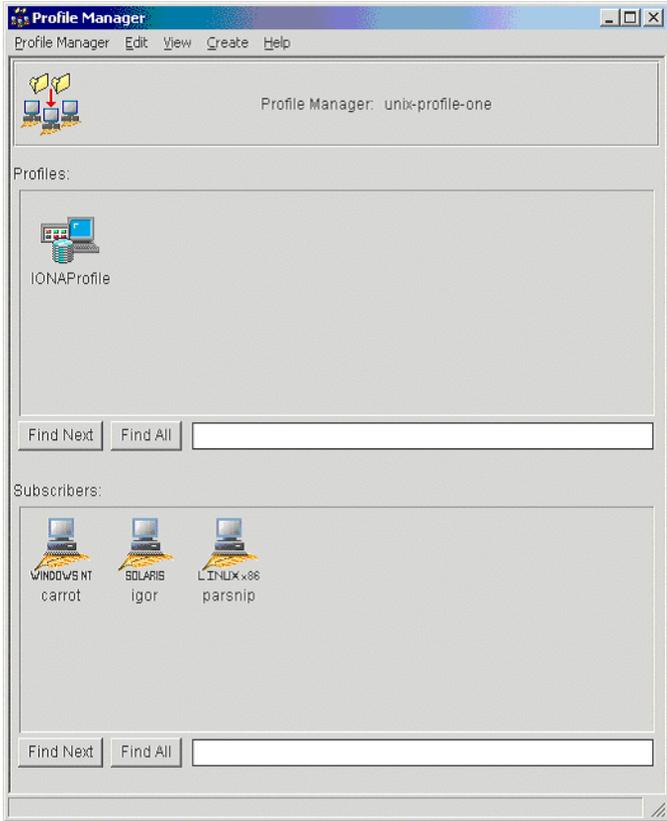


Figure 6: Tivoli Profile Manager

- Open the IONAProfile, and then open the resource model IONAServer Monitor. You will see a resource model with default thresholds and indications, as shown in [Figure 7](#).

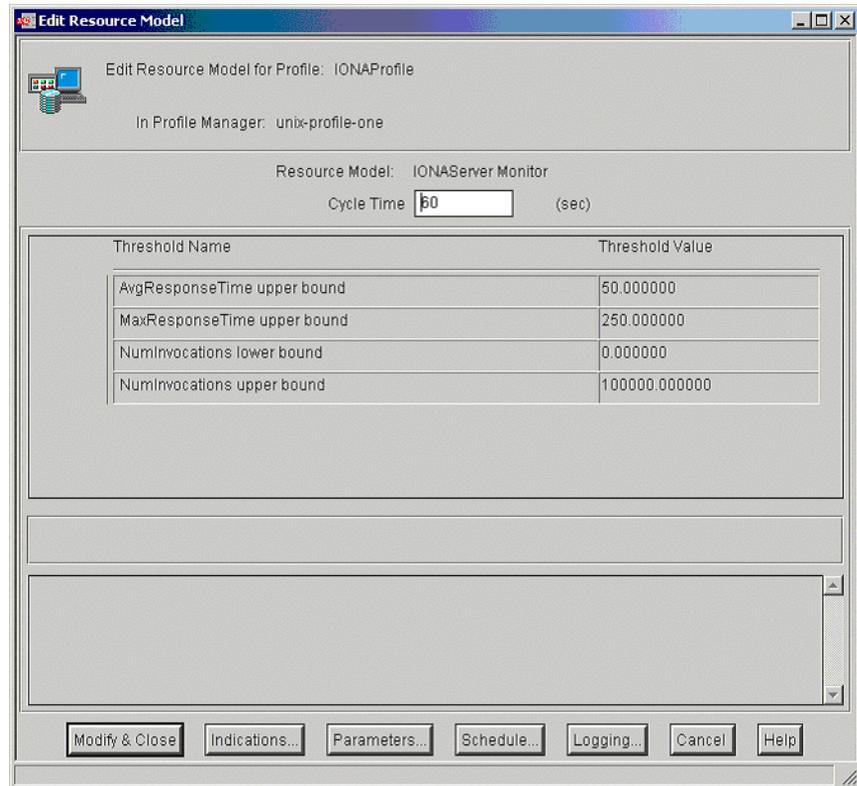


Figure 7: *Edit Resource Model*

Figure 7 shows that the profile has been initialized with default threshold values. Appendix A describes these thresholds in detail; you do not need to be concerned with these now.

7. If you want Tivoli to log historical data on the attributes of each server, click the **Logging...** button for the profile, and then check the box marked **Enable Data Logging** to put logging into effect. This will record historical data for each attribute.
8. Click **Modify & Close**.

Pushing the Resource Model out to your Host

Overview

This section explains how to push the IONA Tivoli resource model out to the endpoint where your IONA product is running (Orbix or Artix).

Pushing out the resource model

To push the IONA Tivoli resource model out to the endpoint where your IONA product is running, perform the following steps:

1. Add the Tivoli endpoint where your IONA product is installed as a subscriber to the profile manager, and distribute the `IONAProfile` to this endpoint.

The resource model should now be running on the endpoint, but it will not yet be able to collect any meaningful data because it needs to be pointed to the `servers.conf` file.

2. Return to the directory where you untarred `tivoli_install.tar`, and change directory to `iona/bin`.
3. Run the `import_tll.sh` script. This installs the task library.
4. Reopen the Tivoli region that you are using on the desktop. You should now see a task library called `IONAServerTaskLibrary`.
5. Open the task library. It contains the following four tasks (also shown in [Figure 8](#)):

```
check_deployment
configure_provider
list_server_commands
server_command
```

6. Run the `check_deployment` task on the endpoint that contains your correctly configured Artix or Orbix installation. It prints out diagnostics to indicate that it has found your `servers.conf` file and your `server_commands.txt` file. This task also verifies the contents of these files.

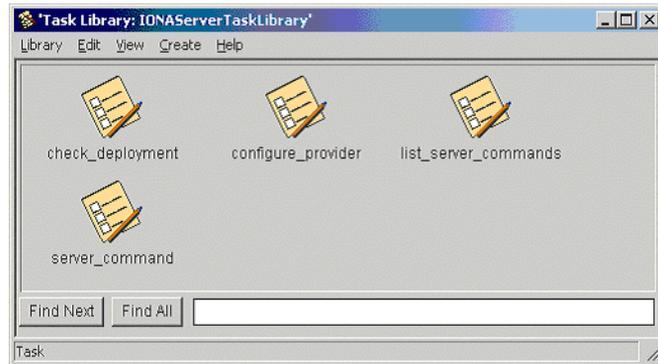


Figure 8: Contents of the IONA Server Task Library

7. If the `check_deployment` task runs successfully, try running `list_server_commands`. This shows a list of actions that you can run on each server, for example:

```
mydomain_locator_myhost,stop
```

Executing this command stops the Orbix locator in `mydomain`. You can execute any of these server commands by running the `server_command` task. This is an exercise for later (described in [“Configuring the resource model”](#) on page 34).

Configuring the Resource Model for your Endpoint

Overview

This section explains how to configure the IONA Tivoli resource model for your endpoint host, and how to test that your integration is configured correctly. It includes the following topics:

- [“Configuring the resource model”](#).
 - [“Testing your Tivoli integration”](#).
 - [“Further information”](#).
-

Configuring the resource model

To configure the resource model for your endpoint, perform the following steps:

1. First, verify that the `configure_provider` script uses the correct location for the `servers.conf` file, and then execute the `configure_provider` task.
2. You must restart the Tivoli Monitoring Engine on the endpoint to pick up this new information. You can do this using the following command:

```
wdmcmd -e endpoint_name -stop
```

Note: On Windows, you might need to allow some time before restarting. This is because it takes time to shut down the Tivoli M12 provider, which hosts the resource model.

3. When this process has finished, it is safe to execute a restart using the following command:

```
wdmcmd -e endpoint_name -restart
```

4. View the status of your deployed resource model by opening the Tivoli **Web Health Console**, and view the data for your host. If all the servers in your domain are running, everything should be fine with no errors.

5. Verify that monitoring is working correctly by killing one of your servers. The effect is not immediately visible on the **Web Health Console**. The delay depends on cycle time setting in the profile. The default is 60 seconds. However, the **Web Health Console** can take longer to refresh.

The quickest way to check the status is by executing the following command:

```
wdmIseng -e endpoint_name -verbose
```

This shows the status of any errors in the deployed resource models.

6. You should be able to start the server again using the task library. Go to the task library and execute the `server_command` task. Fill in the name of the server and the action to perform on it (for example, in this case, `mydomain_locator_myhost, start`). You should see your server start and your health return to 100% in the **Web Health Console** soon after that.

Testing your Tivoli integration

When you have checked that you can start and stop servers and monitor their liveness, you can try some of the other available thresholds.

For example, the IONA Tivoli resource model provides a threshold called **NumInvocations upper bound**. This emits an event when the number of operations that a server receives exceeds a certain threshold, which can indicate that an overload is in progress. You can set the threshold, redistributing the profile. You can test this by writing clients to frequently contact the server in question until the threshold is exceeded.

Further information

For full details on how to use the Tivoli Monitoring product, see the *Tivoli Monitoring User Guide*.

Extending to a Production Environment

This section describes how to extend an IONA Tivoli integration from a test environment to a production environment.

In this chapter

This chapter contains the following sections:

Configuring an Artix Production Environment	page 38
Configuring an Orbix Production Environment	page 42

Configuring an Artix Production Environment

Overview

When you have performed the basic setup steps, then you can move on to the deployment-based production tasks. These include:

- [“Monitoring your own Artix applications”](#).
 - [“Monitoring an Artix application on multiple hosts”](#).
 - [“Monitoring multiple Artix applications on the same host”](#).
 - [“Further information”](#).
-

Monitoring your own Artix applications

You must add the following settings to your Artix server’s configuration file:

```
my_application {  
  
  # Ensure that bus_response_monitor is in your orb_plugins list.  
  orb_plugins = [ ..., "bus_response_monitor"];  
  
  # Collector period (in seconds). How often performance information is logged.  
  plugins:it_response_time_collector:period = "60";  
  
  # Set the name of the file which holds the performance log  
  plugins:it_response_time_collector:filename =  
  "/opt/myapplication/log/myapplication_perf.log";  
  
}
```

Note: The specified `plugins:it_response_time_collector:period` should divide evenly into your cycle time (for example, a period of 20 and a cycle time of 60).

Monitoring an Artix application on multiple hosts

The same principles apply when monitoring your server on multiple hosts. Each host has one `servers.conf` file. In the following example, assume that you want to run the `prdserver` on an endpoint host called `dublin`:

1. Create the `servers.conf` and `server_commands.txt` files for the servers that you want to monitor on the `dublin` host (see [“Setting up your Artix Environment”](#) on page 18 for details).
2. Run the `configure_provider` task selecting the `dublin` endpoint. Enter the location of the `servers.conf` file on the `dublin` host, shown in [Figure 9](#).
3. Restart the Tivoli Monitoring Engine on `dublin` as described in [“Configuring the Resource Model for your Endpoint”](#) on page 34.

Now you should be able to monitor `prdserver` on `dublin`.

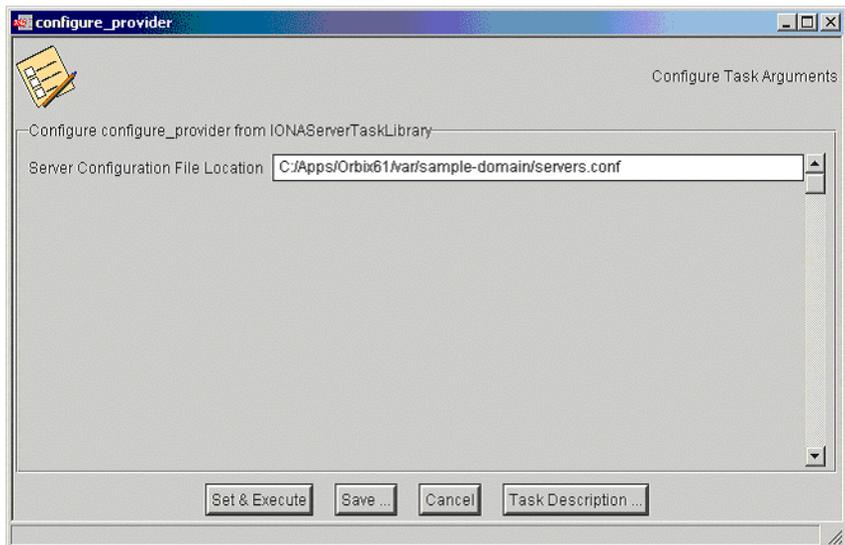


Figure 9: *The configure_provider Task*

Example task

Suppose you want to execute the stop script for the `prdserver` on the `dublin` endpoint. Assuming your `server_commands.txt` file is complete, you can open the `server_command` task selecting the `dublin` endpoint. The script takes the following parameters:

```
Server Command File Location, (location of server_commands.txt)
Server Name,
Server Action,
Server Id
```

The `Server Name` and `Server Id` is `myapplication_prdserver`. The action is `stop`, but the `Server Command File Location` defaults to whatever this location was on the host where you first generated the `tivoli_install.tar`.

You must retype this location so that it points to the correct location on the `dublin` host. Use the same path for your `servers.conf` and `server_commands.txt` files on all hosts, if possible. If not, enter a new location each time that you want to invoke an action on a different host.

Alternatively, you can use the `server_command` task as a template for a new task. After changing the value of `server_commands.txt`, and filling in the other fields, instead of clicking **Set & Execute**, click **Save...** You can rename this task as, for example, `stop_prdserver_on_dublin`.

If you want more flexibility in deciding which parameters to default and which to leave open, you can create a custom task library based on the IONA Tivoli task library. A description of how this is done is beyond the scope of this document. If you need to do this, contact IONA Professional Services.

Monitoring multiple Artix applications on the same host

Sometimes you may need to deploy multiple separate Artix applications on the same host. The solution is to merge the `servers.conf` and `server_commands.txt` files from each of the applications into single `servers.conf` and `server_commands.txt` files.

For example, if the `servers.conf` file from the `UnderwriterCalc` application looks as follows:

```
UnderwriterCalc,1,/opt/myAppUnderwritierCalc/log/UnderwriterCalc_perf.log
```

And the `servers.conf` file for the `ManagePolicy` application looks as follows:

```
ManagePolicy, 1, /opt/ManagePolicyApp/log/ManagePolicy_perf.log
```

The merged `servers.conf` file will then include the following two lines:

```
UnderwriterCalc,1,/opt/myAppUnderwritierCalc/log/UnderwriterCalc_perf.log
ManagePolicy, 1, /opt/ManagePolicyApp/log/ManagePolicy_perf.log
```

Exactly the same procedure applies to the `server_commands.txt` file.

Further information

For full details on how to use the Tivoli Monitoring product, see your *Tivoli Monitoring User Guide*.

Configuring an Orbix Production Environment

Overview

When you have performed the basic setup steps, then you can move on to the deployment-based production tasks. These include:

- [“Monitoring your own Orbix applications”](#).
 - [“Monitoring your Orbix servers on multiple hosts”](#).
 - [“Monitor multiple Orbix domains on the same host”](#).
 - [“Further information”](#).
-

Monitoring your own Orbix applications

You can use the **Orbix Configuration** tool to enable Tivoli management of Orbix services. Enabling Tivoli to manage your own Orbix applications involves the following steps:

1. You must configure your application to use performance logging (see the *Orbix Management User's Guide* for a full description). For example, suppose you have a server executable named `myapplication_prdserver` that executes with the ORB name `myapplication.prdserver`. The typical configuration would be as follows:

C++ applications

```
myapplication {
  prdserver {
    binding:server_binding_list = ["it_response_time_logger+OTS", ""];
    plugins:it_response_time_collector:period = "30";
    plugins:it_response_time_collector:server-id
      = "myapplication_prdserver";
    plugins:it_response_time_collector:filename =
      "/opt/myapplication/logs/prdserver/prdserver_perf.log";
  }
}
```

Java applications

```
myapplication {
  prdserver {
    binding:server_binding_list = ["it_response_time_logger+OTS", "..."];
    plugins:it_response_time_collector:period = "30";
    plugins:it_response_time_collector:server-id = "myapplication_prdserver";
    plugins:it_response_time_collector:log_properties = ["log4j.rootCategory=INFO, A1",
      "log4j.appender.A1=com.iona.management.logging.log4jappender.TimeBasedRollingFile
      Appender",
      "log4j.appender.A1.File=/opt/myapplications/logs/prdserver_perf.log",
      "log4j.appender.A1.layout=org.apache.log4j.PatternLayout",
      "log4j.appender.A1.layout.ConversionPattern=%d{ISO8601} %-80m %n"];
  }
}
```

Note: The specified `plugins:it_response_time_collector:period` should divide evenly into your cycle time (for example, a period of 20 and a cycle time of 60).

- The most important configuration values are the `server-id` and the C++ filename or Java `log_properties` used by the `response_time_collector`. You can add these values to the `servers.conf` file to make the IONA Tivoli resource model aware of your application as follows:

```
myapplication_prdserver, 1,
  /opt/myapplication/logs/prdserver/prdserver_perf.log
```

- Restart your endpoint. Now Tivoli will monitor the execution of the `myapplication_prdserver`.
- To control the `myapplication_prdserver` server through the `server_command` task, edit the `server_commands.txt` file. For example you could add the following entries to the `server_commands.txt` file:

```
myapplication_prdserver,start =
  /opt/myapplication/scripts/prdserver_start.sh
myapplication_prdserver,stop =
  /opt/myapplication/scripts/prdserver_stop.sh
myapplication_prdserver,restart =
  /opt/myapplication/scripts/prdserver_restart.sh
```

The `prdserver_start.sh`, `prdserver_stop.sh` and `prdserver_restart.sh` scripts will be written by you.

Monitoring your Orbix servers on multiple hosts

The same principles apply when monitoring your Orbix servers on multiple hosts. Each host has one `servers.conf` file. In the following example, assume that you want to run the `prdserver` on an endpoint host called `dublin`:

1. Write the `servers.conf` and `server_commands.txt` files for the servers that you want to monitor on the `dublin` host (see [“Setting up your Orbix Environment”](#) on page 20 for details).
2. Run the `configure_provider` task selecting the `dublin` endpoint. Enter the location of the `servers.conf` file on the `dublin` host, shown in [Figure 9](#).
3. Restart the Monitoring Engine on `dublin` as described in [“Configuring the Resource Model for your Endpoint”](#) on page 34.

Now you should be able to monitor `prdserver` on `dublin`.

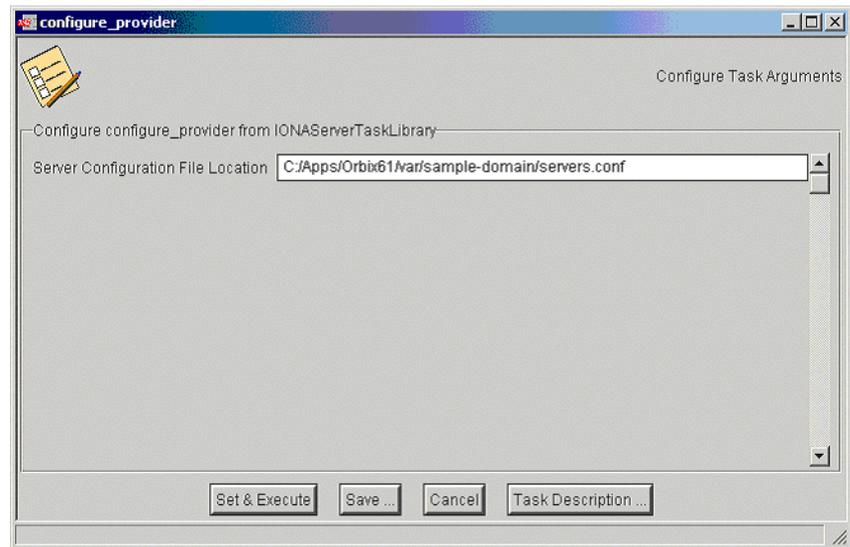


Figure 10: *The configure_provider Task*

Example task

Suppose you want to execute the stop script for the `prdserver` on the `dublin` endpoint. Assuming your `server_commands.txt` file is complete, you can open the `server_command` task selecting the `dublin` endpoint. The script takes the following parameters:

```
Server Command File Location, (location of server_commands.txt)
Server Name,
Server Action,
Server Id
```

The `Server Name` and `Server Id` is `myapplication_prdserver`. The action is `stop`, but the `Server Command File Location` defaults to whatever this location was on the host where you first generated the `tivoli_install.tar`. You must retype this location so that it points to the correct location on the `dublin` host. Use the same path for your `servers.conf` and `server_commands.txt` files on all hosts, if possible. If not, enter a new location each time that you want to invoke an action on a different host.

Alternatively, you can use the `server_command` task as a template for a new task. After changing the value of `server_commands.txt`, and filling in the other fields, instead of clicking **Set & Execute**, click **Save...** You can rename this task as, for example, `stop_prdserver_on_dublin`.

If you want more flexibility in deciding which parameters to default and which to leave open, you can create a custom task library based on the IONA Tivoli task library. A description of how this is done is beyond the scope of this document. If you need to do this, contact IONA Professional Services.

Monitor multiple Orbix domains on the same host

You may have more than one Orbix configuration domain running on the same host. Tivoli is not aware of concepts like Orbix configuration domains and the current solution for this is to have the IONA Tivoli resource model perform monitoring of all domains on the same host. This means having only one `servers.conf` or `server_commands.txt` file for each host.

This could potentially cause problems if you have servers on the same host that have the same ORB name and by extension the same default value for the following variable:

```
plugins:it_response_time_collector:server-id
```

This is why, by default, the server IDs are generated with the domain name added as prefix and the host name added as suffix (for example, `mydomain_locator_myhost`).

A typical `servers.conf` file with two domains (`mydomain` and `yourdomain`) would look as follows:

```
mydomain_locator, 1,  
/opt/iona/var/domains/mydomain/logs/locator_myhost_perf.log  
...  
yourdomain_locator, 1,  
/opt/iona/var/domains/yourdomain/logs/locator_yourhost_perf.log
```

Similarly for the task library:

```
mydomain_locator_myhost , start,  
/opt/iona/etc/bin/mydomain_locator_start.sh  
...  
yourdomain_locator_yourhost , start,  
/opt/iona/etc/bin/yourdomain_locator_start.sh
```

Further information

For full details on how to use the Tivoli Monitoring product, see your *Tivoli Monitoring User Guide*.

Using the IONA Tivoli Integration

This chapter explains how to perform common tasks using the IONA Tivoli integration. For example, how to access historical data, or detect when a server is down.

In this chapter

This chapter contains the following sections:

Detecting Common Server Problems	page 48
Tracking Server Performance Metrics	page 50
Stopping, Starting, and Restarting Servers	page 51

Detecting Common Server Problems

Overview

This section explains how to detect common server problems using the IONA Tivoli integration. It includes the following:

- [“Detecting possible server crashes”](#).
 - [“Detecting problems with response times”](#).
 - [“Detecting heavy traffic”](#).
 - [“Enabling data logging for your servers”](#).
 - [“Further information”](#).
-

Detecting possible server crashes

An `Ev_IONAServer_ServerStatus_matches` event is sent when a server listed in `servers.conf` fails to log a `status=running` message since the beginning of the last cycle. The `Ev_IONAServer_ServerStatus_matches` event contains information about the identity of the server that has stopped running.

The cycle time can be set appropriately before you distribute your profile. It is important that the configured value of the `plugins:it_response_time_collector:period` is always less than the cycle time. Otherwise, you may get spurious events of this type. The specified period should divide evenly into your cycle time (for example, a period of 20 and a cycle time of 60).

For more details on configuration variables, see [“Extending to a Production Environment” on page 37](#).

Detecting problems with response times

If the average response time of a server exceeds the average response time threshold (`Thr_IONAServer_Resource_Model_AvgResponseTime_gt`), an event is emitted to warn the user. A higher than expected response time may indicate a heavy load or possibly a failure that is causing an unexpectedly slow response for users. This threshold should be set appropriately for the servers that you are monitoring. This can be done in a profile or a policy.

There is also a threshold for maximum response times (`Thr_IONAServer_Resource_Model_MaxResponseTime_gt`). The maximum response time refers to the slowest operation that took place on a server during the last collection cycle. Typically, this value can vary a lot more than the average response time, so you might want to set this threshold higher than the average response time.

Detecting heavy traffic

The `NumInvocations` parameter tracks the number of invocations being processed by the server during each cycle. You must treat this metric with caution because it is not normalized and can be prone to sampling errors. For example, small differences in the actual cycle time could mean that you pick up an extra log entry during the lifetime of a particular cycle. This can lead to a spike in the data.

The effect of this is lessened when the ratio of cycle time/collector period increases. For example, if the performance logging plugin logs data every 60 seconds and the cycle time is 60 seconds, the error could be as much as +/- 100%. If the ratio of cycle time/collector period is 10, the error for this parameter is +/- 10%.

Enabling data logging for your servers

Before you distribute your `IONAProfile`, or indeed any profile based on the IONA Tivoli resource model, it is recommended that you enable logging in the profile as follows:

1. In the Tivoli **Monitoring Profile** window, double click on **IONAServer Monitor** in the top pane.
2. This launches an **Edit Resource Model** window, click on the **Logging...** button in this window.
3. Ensure that the **Enable Data Logging** button is checked.
4. Click **Apply Changes and Close**.
5. Click **Modify & Close** in the **Edit Resource Model** window.

If you do this before distributing the profile, the Tivoli Agent will track and summarize data for all of the attributes in the resource model. You can use these historical logs for a number of tasks (for example, server downtime, explained in the next section).

Further information

For descriptions of all the events, thresholds, and parameters in the IONA Tivoli resource model, see [Appendix A](#).

Tracking Server Performance Metrics

Overview

This section explains how to track key server performance metrics (for example, server downtime and response time). It includes:

- [“Examining server downtime”](#).
 - [“Tracking other server performance metrics”](#).
-

Examining server downtime

To examine server downtime, perform the following steps:

1. Open the **Web Health Console** and connect to a machine that is running your profile.
2. In the top pane (the one labelled **Resource Models on Hostname**), select the **Historical Data** radio button.
3. In the bottom pane, choose the `IONAServer_Resource_Model` in the left-hand drop-down box, and `IONAServer_Resource_Model_Availability` in the right-hand drop-down box.
4. In the left-hand selection, choose the name of the server that you want to examine.
5. In the right-hand selection, choose `ServerStatus`.

A table is displayed that shows when the server was running, and for what periods (if any) that its status was unknown. This will most likely be because the server was not running.

Tracking other server performance metrics

Follow steps 1-4 listed for [“Examining server downtime”](#). But this time, choose a different metric on the right.

For example, to view a history of the average response time of your server, choose `AvgResponseTime (AVG)`. The data is displayed in tabular form for the last hour, by default. However, you can choose to view data for longer periods. The range of graphical presentation options, such as line and bar charts, can give a useful insight into your server usage patterns.

Another metric of interest is `NumOperations`. This tracks the throughput of your server. Viewing the history can help you identify times when the server usage peaks.

Stopping, Starting, and Restarting Servers

Overview

This section explains how to use the `IONAServerTaskLibrary` to perform actions on servers (for example, stop, start, or restart). It includes:

- [“Establishing which servers and operations are tracked”](#).
 - [“Example of starting the locator service”](#).
-

Establishing which servers and operations are tracked

The `IONAServerTaskLibrary` enables you to stop, start or restart your servers. To check what servers are recognized by the system and what operations are defined for them, perform the following steps:

1. Double click on the `IONAServerTaskLibrary`.
2. Double click on `list_server_commands`.
3. Click the **Display on Desktop** checkbox.
4. Click the endpoint on which to execute the task.
5. Select **Execute & Dismiss**.
6. Verify that the **Server Command File Location** is correct (this is the `server_commands.txt` file).
7. Click **Set & Execute**.

A list of recognized servers and the operations supported for those servers is displayed.

Example of starting the locator service

To start an Orbix locator service (for example, in the domain `foo`, on the host `patrick`) perform the following steps:

1. Double click on the `IONAServerTaskLibrary`.
2. Double click on `server_command`.
3. Click the **Display on Desktop** checkbox. Select the endpoint on which to execute the task.
4. Click **Execute & Dismiss**.

5. Verify that the **Server Commands File Location** is correct (this is for the `server_commands.txt` file)
6. Fill in the name and ID of the server (`foo_locator_patrick`) and the action (`start`).
7. Click **Set & Execute**.

IONA Tivoli Resource Model

This appendix describes the contents of the IONA Tivoli resource model. It includes descriptions of the thresholds, events, and parameters used in this model, along with a WBEM/CIM definition.

In this appendix

This chapter contains the following sections:

Thresholds	page 54
Events	page 56
Parameters	page 57
WBEM/CIM Definition	page 58

Thresholds

This section describes the thresholds in the IONA Tivoli resource model. It lists an internal name and description of each threshold.

Thr_IONAServer_Resource_Model_AvgResponseTime_gt

When the `AvgResponseTime` counter exceeds this threshold, the `Ev_IONAServer_Resource_Model_AvgResponseTime_too_high` event is generated.

The default value is 50.

This threshold corresponds to the **AvgResponseTime upper bound** threshold displayed in the **Profile Manager** GUI.

Thr_IONAServer_Resource_Model_MaxResponseTime_gt

When the `MaxResponseTime` counter exceeds this threshold, the `Ev_IONAServer_Resource_Model_MaxResponseTime_too_high` event is generated.

The default value is 250.

This threshold corresponds to the **MaxResponseTime upper bound** threshold displayed in the **Profile Manager** GUI.

Thr_IONAServer_Resource_Model_NumInvocations_lt

When the `NumInvocations` counter is lower than this threshold, the `Ev_IONAServer_Resource_Model_NumInvocations_too_low` event is generated.

The default value is 0.

This threshold corresponds to the **NumInvocations lower bound** threshold displayed in the **Profile Manager** GUI. This threshold is useful for detecting server hangs when used in conjunction with a ping client that is run at regular intervals.

Thr_IONAServer_Resource_Model_NumInvocations_gt

When the `NumInvocations` counter exceeds this threshold the `Ev_IONAServer_Resource_Model_NumInvocations_too_high` event is generated.

The default value is 100000.

This threshold corresponds to the **NumInvocations upper bound** threshold displayed in the **Profile Manager** GUI.

Events

This section describes the events in the IONA Tivoli resource model. It lists an internal name and description of each event.

Ev_IONAServer_Resource_Model_AvgResponseTime_too_high

This event is generated when the `AvgResponseTime` counter exceeds the **AvgResponseTime upper bound** threshold.

Ev_IONAServer_Resource_Model_MaxResponseTime_too_high

This event is generated when the `MaxResponseTime` counter exceeds the **MaxResponseTime upper bound** threshold.

Ev_IONAServer_Resource_Model_NumInvocations_too_low

This event is generated when the `NumInvocations` counter is lower than the **NumInvocations lower bound** threshold.

Ev_IONAServer_Resource_Model_NumInvocations_too_high

This event is generated when the server is receiving a large number of invocations, and when the `NumInvocations` counter exceeds the **NumInvocations upper bound** threshold. This can be an indication of overload.

Ev_IONAServer_Server_Status_matches

This event is generated when the status of the server is unknown.

Parameters

This section describes the parameter in the IONA Tivoli resource model. It lists an internal name and description.

Par_Problematic_Status_Values_eqs

This specifies values that indicate a problem with the server status. Possible values are as follows:

- unknown
- shutdown_started
- shutdown_complete

WBEM/CIM Definition

WBEM/CIM refers to Web-Based Enterprise Management/Common Information Model. The WBEM/CIM definition for the IONA Tivoli resource model is as follows:

```
#pragma namespace ("\\\\.\\ROOT\\CIMV2")

[
Dynamic,
M12_Instrumentation("Java.com.iona.management.provider.tivoli.AR
TILTProviderImpl | | ENUM"),
Provider("M12JavaProvider")
]
class IONAServer
{
    [Key, Description("The unique name of an IONA Server
Replica")]
    string Identifier;

    [
    Dynamic,

    M12_Instrumentation("Java.com.iona.management.provider.tivoli
.ARTILTProviderImpl | | GET"),
    Provider("M12JavaProvider")
    ]
    uint32 NumInvocations;

    [
    Dynamic,

    M12_Instrumentation("Java.com.iona.management.provider.tivoli
.ARTILTProviderImpl | | GET"),
    Provider("M12JavaProvider")
    ]
    uint32 MaxResponseTime;
```

```
[
    Dynamic,

    M12_Instrumentation("Java.com.iona.management.provider.tivoli
    .ARTILTPProviderImpl | | GET"),
    Provider("M12JavaProvider")
]
uint32 MinResponseTime;

[
    Dynamic,

    M12_Instrumentation("Java.com.iona.management.provider.tivoli
    .ARTILTPProviderImpl | | GET"),
    Provider("M12JavaProvider")
]
uint32 AvgResponseTime;

[
    Dynamic,

    M12_Instrumentation("Java.com.iona.management.provider.tivoli
    .ARTILTPProviderImpl | | GET"),
    Provider("M12JavaProvider")
]
string ServerStatus;
};
```


Index

A

Apply Changes and Close 49
average response time 48, 50
AvgResponseTime 50
AvgResponseTime upper bound 54

B

binding:server_binding_list 42, 43
bus_response_monitor 38

C

C++ configuration 42
check_deployment task 32
configure_provider 34, 39, 44
configure_provider task 32
crash, server 48
create_profile.sh 28
create_tivoli_install_bundle 26, 27
cycle time 35, 43, 48

D

Display on Desktop 51
Domain Settings 21

E

Edit Resource Model 49
EMS 10
Enable Data Logging 31, 49
Enterprise Management System 10
events 56
Ev_IONAServer_Resource_Model_MaxResponseTime
too_high 56
Ev_IONAServer_Resource_Model_NumInvocations_t
oo_high 56
Ev_IONAServer_Resource_Model_NumInvocations_t
oo_low 56
Ev_IONAServer_Server_Status_matches 56
Ev_IONAServer_ServerStatus_matches 48
Execute & Dismiss 51

F

filename 43

G

Generate EMS Configuration Files 21

I

import_tll.sh 28
IONAProfile 28, 49
IONAServer Monitor 30, 49
IONAServer_Resource_Model 50
IONAServer_Resource_Model_Availability 50
IONAServerTaskLibrary 32, 51
IONA Tivoli resource model 49
itconfigure tool 21
it_response_time_logger 42, 43

J

Java configuration 43

L

Launch Service on Domain Startup 22
list_server_commands task 32
log file interpreter 11
Logging... 31, 49
log_properties 43

M

maximum response time 49
MaxResponseTime upper bound 54
Modify & Close 31, 49
Monitoring Profile 49

N

NumInvocations 49
NumInvocations lower bound 54
NumInvocations upper bound 35, 55, 56
NumOperations 50

O

Orbix Configuration tool 21, 42
 orb_plugins 38
 Other Properties 22

P

parameters 57
 Par_Problematic_Status_Values_eqs 57
 performance log files 18
 performance logging
 configuration 22
 plugins 11
 plugins:it_response_time_collector:filename 38, 42
 plugins:it_response_time_collector:log_properties 4
 3
 plugins:it_response_time_collector:period 38, 42,
 43, 48
 plugins:it_response_time_collector:server-id 42, 43,
 45
 Profile Manager 28, 54
 pskill 19

R

resource model
 events 56
 parameters 57
 thresholds 54
 response time 11
 average 48
 maximum 49
 response_time_collector 43

S

Save... 40, 45
 server_command 40, 45
 Server Command File Location 40, 45, 51
 server_commands.txt 23, 32, 40, 41, 45, 51
 server_command task 32, 35, 43
 server crash 48
 server-id 43
 servers.conf file 23, 32, 39, 41, 44
 ServerStatus 50

Service Launching 22
 Set & Execute 40, 45, 51
 setup utilities 14
 shutdown_complete 57
 shutdown_started 57
 stopping
 applications on Windows 19

T

taskkill 19
 threshold
 average response time 48
 maximum response time 49
 thresholds 54
 Thr_IONAServer_Resource_Model_AvgResponseTim
 e_gt 48, 54
 Thr_IONAServer_Resource_Model_MaxResponseTim
 e_gt 49, 54
 Thr_IONAServer_Resource_Model_NumInvocations_
 gt 55
 Thr_IONAServer_Resource_Model_NumInvocations_
 lt 54
 Tivoli Desktop 28
 tivoli_install.tar 27, 40, 45
 tivoli_integration.tar 26
 Tivoli Management Framework 13
 Tivoli Monitoring 13
 Tivoli profile manager 27
 Tivoli region name 27
 Tivoli task library 14, 19
 Tivoli Web Health Console 34

U

unknown 57

W

WBEM/CIM definition 58
 wdmcmd 34
 wdmiseng 35
 Web Health console 50
 Windows
 stopping applications 19