

ISService Profiler



User Guide

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1 INTRODUCTION

The Wrightia's webMethods IS Service Profiler is a tool to collect and analyze runtime information about Integration Server Services. For the remaining of this document this tool is referenced as Service Profiler.

It is intended to have a small footprint while running, be easy and fast to install and uninstall, and to require no configuration over the Services being profiled.

1.1 Document Objectives

This document is the User Guide for v1.1, v1.2, v1.3, v1.4 and v1.5 of the tool.

Its main objective is to be used as the reference for the user of the tool. The guide contains information spanning from installation and setup to advanced usage.

1.2 Target Audience

This document is targeted to any user of the tool, independently of the level of intervention, responsibility or technical ability.

1.3 Pre-requisites

This document will not discuss usability subjects that are specific to the webMethods platform and/or its tools, such as Integration Server administration, Developer, Service details, Package management and usage, etc.

So, a basic knowledge of the Integration Server structure and administration, Package management and Service development is a fundamental requirement.

For the purpose of installation, some basic knowledge of the underlying operating system is also required.

1.4 Environment Requirements & Compatibility

The tool has been constructed to be restricted only by the Integration Server requisites. Therefore, the only environment it needs to run is the Integration Server, and there is no dependency on an existing Broker, Audit DB, Modeler, Developer, Workflow or any other tool.

There is no additional memory requirement above the required by the Integration Server.

The technical specifications for the tool are defined for Hardware & Operating System platform, Integration Server and JVM compatibility. The compatibility can be categorized in a combination of Expected, Tested and Available, as explained in Table 1, below.

Table 1 - Compatibility Categorization

Category	Description
Expected	According to the technical specifications and/or documented behavior, it is expected to be 100% compatible.
Tested	The specific version has been successfully tested.
Available	A version for the specific configuration is readily available.

Table 2 - Compatibility Matrix

Item	Version	CPU	Data Model	Expected	Tested	Available	Comment
OS	Windows 2000 & XP	Intel	32	☑	☑	☑	
	Windows 2003 Server	Intel	32	☑	☑	☑	
	Windows 2003 Server x64	AMD64	64	☑	☑	☑	
	Windows 2008	Intel	32	☑	☑	☑	
	Windows 2008 x64	AMD64	64	☑	☑	☑	
	Sun Solaris	SPARC	32/64	☑	☑	☑	Tested on Solaris 8 & 9. The 64-bit version only runs on Solaris 9, or above.
		AMD64	32/64	☑	☑	☑	Tested on Solaris 10.
	AIX	PPC	32/64	☑	☑	☑	A small, but fundamental, part of the tool is distributed has a native <i>Dynamic Library</i> . Specific OS platform availability is only limited by the existence of the generated binaries, or the existence an ANSI C compiler in the target environment for a 1 st time compilation and test.
	HP-UX	PA-RISC	32	☑	☑	☑	Tested on HP_UX v11.11B.
		PA-RISC 64	32/64				
		Itanium	32/64	☑	☑	☑	
	Linux	Intel	32	☑	☑	☑	Tested with Red Hat and Suse. Tested also with Red Hat ES 4.0.
		AMD64	32/64	☑	☑	☑	Tested with Red Hat ES 4.0.
	OS X	Intel	32/64	☑	☑	☑	Only for Mac OS X v10.5 and above.
IS	v6.0			☑	☐	☑	
	v6.0.1 SP2			☑	☑	☑	
	v6.1 FP2			☑	☑	☑	
	v6.1 SP1			☑	☑	☑	
	v6.5.x			☑	☑	☑	Interface available only through the IS administration pages.
	v7.0.x			☑	☑	☑	
	v7.1.x			☑	☑	☑	
	v8.0.x			☑	☑	☑	
	v8.1.x			☑	☑	☑	
	v8.2.x			☑	☑	☑	
	v9.0-v9.5			☑	☑	☑	
	v9.6-v9.10			☑	☑	☑	
JVM	1.3.1		32	☑	☑	☑	When using a JRE other than the one bundled with the Integration Server, be sure to make the <code>tools.jar</code> library available. Default JRE distributions do not include this library. It can be retrieved from the JDK and placed in the <code>ext</code> folder of the JRE. The only tested manufacturers were HP, IBM and SUN.
	1.4.0, 1.4.1		32	☑	☐	☑	
	1.4.2			☑	☑	☑	
	1.5.0		32/64	☑	☑	☑	
	1.6.x		32/64	☑	☑	☑	
	1.7.x		32/64	☑	☑	☑	

Item	Version	CPU	Data Model	Expected	Tested	Available	Comment
	1.8		32/64	☒	☒	☒	

The **Integration Server** and **JVM** version listed in **Table 2 (above)** have been supported and tested since the first available version of the **Service Profiler**. However, the same cannot be alleged for the supported **Operating Systems**. The **OSs** have been tested and supported has the tool evolved, being introduced in specific tool versions, as stated in **Table 3 (below)**.

Table 3 - Service Profiler version for Operating System

OS	CPU Arch	Profiler version
Windows 2000 & XP	Intel	v1.0
Windows Server 2003	Intel	v1.0
Linux	Intel	v1.0
HP-UX	PA	v1.0
Sun Solaris	SPARC 32	v1.0
HP-UX	Itanium	v1.0.1
Linux	AMD64	v1.0.2 patch #3
Windows Server 2003 x64	AMD64	v1.0.2 patch #3
Sun Solaris	SPARC 64	v1.0.3
AIX	PPC / PPC64	v1.2.1
Sun Solaris	AMD64	v1.2.1 patch #1
Linux	IBM s390	v1.5

2 INSTALLATION AND SETUP

The installation steps are detailed at a customized page from the tool's page at the website.

2.1 First-time Installation

Basically, the installation and setup is comprised of the following steps, in order:

- Install the packages;
Mind the order by which the packages are installed:

- `WiaRoot`;
- `WiaUtilities`;
- `WiaRuntimeEcosystem`;
- `WiaServiceProfiler`.

When this package is installed it may have load errors leaving it as **partial**. This is because some its **Java** services reference classes that reside in libraries in the `static` folder and these are only mounted when the **Integration Server** (re)starts.

The installation of this package does not give immediate access to the tools functionality and it will be partially disabled (*as in Figure 3, on page 14*). To fully enable the tool, the installation needs extra steps to be complete (*please read further*).

- Edit the startup scripts;

Depending on the version of the **Integration Server** and which is the **Operating System** the scripts and nature of the changes vary.

The purpose of this editing is to add to the server's **Java** command line the instructions to load the profiler classes as part of the **JVM**.

Refer for detailed steps available from the tool's download page at our website.

- Set the **License Key**.

When the tool is first installed there is no **License Key** set and any attempt to perform an action will result in a '**License not set**' exception. The license is set in the licensing pages of the tool.

2.2 Intentionally preventing the Profiler from loading

The **Service Profiler** can be intentionally prevented from being by the **Integration Server**, without the need to uninstall it. This can be achieved by means of putting a file named `ISSPROF_VOID` in the `<wm_dir>/IntegrationServer` folder (See [Figure 2, below](#)). The presence of this file causes the loading sequence to be skipped. A direct result is having the functionality links disabled in the tool pages menu.

This operation can be done and removed from the tool's admin page (see [Figure 1, below](#)) without the need to go to the file system and/or command-line prompt. As is shown in [Figure 1](#), upon pressing the **[Save Changes]** button, if the check-box is checked the before mentioned file is created, otherwise it is removed. Any option that requires an **Integration Server** restart to be effective is marked with the **!** icon by its side. After saving changes the icon starts glowing to indicate that the option is set but a restart¹ is still required to make it effective.

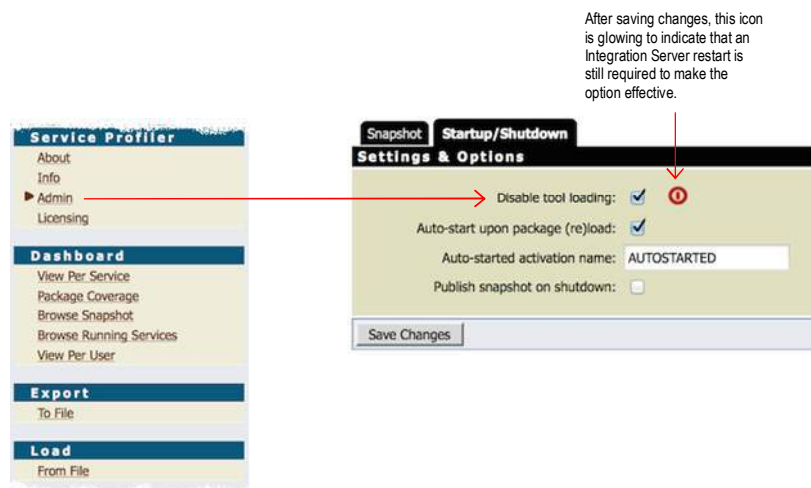


Figure 1 - Administration option for preventing the **Service Profiler** from loading



Figure 2 - Preventing the **Service Profiler** from loading

IMPORTANT: The functionality menus will be disabled whenever the tool core libraries are prevented from loading... or an error prevented them to be successfully loaded.

¹ It will have to be a complete shutdown followed by a startup. The server restart function will not work properly because it does not perform a complete shutdown-and-startup sequence, thus not assuming reconfigurations.

The reactivation of the tool can be done in the same administration option. When tool is deactivated, only the menu options that can be used while in this state are enabled. For the same reason, the admin page only contains options that are valid when the tool is deactivated (See [Figure 3](#), below).

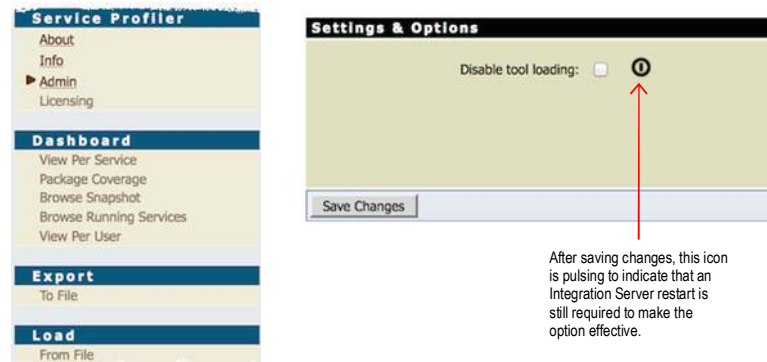


Figure 3 - Reactivate the Service Profiler

2.3 Re-installing or Upgrading

Due to the nature of the technology involved and the way it interacts with the **Integration Server**, not all updates can be installed while it is running:

- There are libraries being loaded even before the **Integration Server** starts and those can only be replaced by exiting the **JVM** completely.
- Even though an **IS Package** has its own class loader and could be replaced with the server running, the **WiaServiceProfiler** contains libraries that are directly loaded by the server class loader and thus cannot be unloaded without shutting it down. If you try to remove, or reinstall, this package using the package management pages it will not be successful... simply because the server will be locking some library files and the package files will not be deleted/moved/replaced.

As a rule-of-thumb, a reinstallation would only assured by first uninstalling the current version. However, this is not always needed and if so it should be referenced in the release notes specific to the new version or upgrade.

Some patches or **FIXes** will have their own install instructions, which could be highly simplified and not involve a complete uninstall, not even a server shutdown.

There are a few settings (*summarized in [Table 4](#), on page 15*) that you might be interested to safeguard before attempting an upgrade:

- Configuration and administrative settings;

These instructions are only needed for versions of **Service Profiler** prior to **v1.4**. Since this version, these files are automatically kept out of the package structure, under the folder `packages.var`, and are therefore safe from being moved out with the installation of a new version of the package.

So, for versions prior to **v1.4**, make a copy of the `.cnf` files in the `config` folder of the **WiaServiceProfiler** package, to some place out of the package structure.

If they happen to be removed by the (re)installation, copy those files back after the upgrade (a fresh installation does not (re)create them, but the start-up of the package does create empty versions).

- **ACL** settings.

If you have customized the **ACL** settings you may have to redo those settings in the new installation.

Table 4 - Setting to safeguard before installing an upgrade

Setting	Action
Configuration and administrative	If upgrading from a version prior to v1.4, copy the <code>packages/WiaServiceProfiler/config/*.cnf</code> files to a folder outside the package structure. These files contain specific settings customized after installation.
Security	Any ACLs settings customized after installation may have to be configured again in the server administration pages. Check those settings and write them down for reference.

2.4 Uninstalling

Uninstalling the **Service Profiler** means the complete removal of its components and files. However, if the sole intent is to keep the tool from being loaded and have it performing no work at all, this can easily be accomplished without uninstalling (*please refer to **Intentionally preventing the Profiler from loading**, on page 13*).

To completely uninstall the tool:

- Shutdown the **Integration Server**;
If the **Integration Server** is running as an **Windows NT Service** you must unregister it before the next step.
- Revert the **Integration Server** launch script to the original;
Copy the saved original scripts or just remove the lines inserted upon installation.
Depending on the **Integration Server** version, which files these are may vary. Please refer to the installation procedure for details on the saved file and/or the inserted lines;
- Delete the folder `<wm_dir>/IntegrationServer/serviceprofiler`;
- Delete the folder for the package `WiaServiceProfiler`;
- For versions **v1.4** and above, remove the folder
`<wm_dir>/IntegrationServer/packages.var/WiaServiceProfiler`;
If the folder `WiaServiceProfiler` is the only one under `packages.var`, then this one can also be removed.
- If the **Integration Server** is configured to run as a **Windows NT Service**, unregister the service and register it again.
- Start the **Integration Server**;
- Delete support **IS Packages**;
If no longer needed (*e.g.*; not referenced or needed by any other packages), delete the packages `WiaRuntimeEcosystem`, `WiaUtilities` and `WiaRoot`.
- Remove the `WiaServiceProfiler`s **ACL**.

3 SECURITY AND CONTROLLED ACCESS

The **Service Profiler** has the access controlled through its own **ACL** definition:

`WiaServiceProfilers`.

By default, during installation, the `Developers` and the `Administrators` **User Groups** are associated with this **ACL**.

You can customize the access to the tool pages and services through the association of **User Groups** to this **ACL**. However, only users that are also associated with the **Administrators ACL** can use the **Licensing** pages of the tool.

4 FUNCTIONALITY GUIDE

4.1 Administration Page

This page is accessed through the **Admin** menu entry and contains the editing of settings that affect the overall tool behavior.

- Administration;

Direct administration actions over the **Service Profiler**. These actions are resumed to the **Start** and **Stop** of the tool.

Started means that the tool is actively collecting information about the currently running **IS Services**.

When the package is (re)loaded, the tool is **Stopped** and therefore any of the functionality based on snapshots will issue an (**Profiler Not Started**) error if used under this condition.

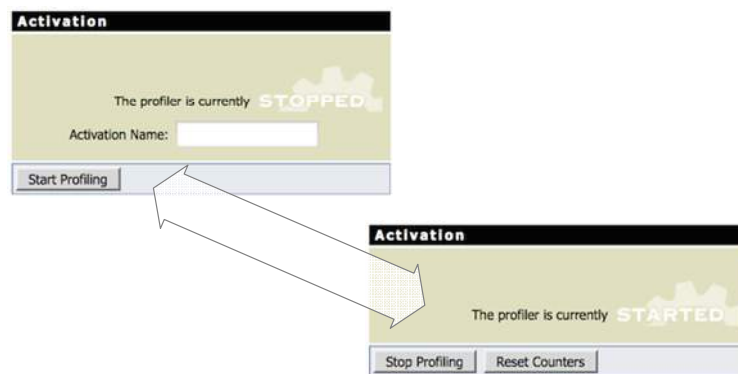


Figure 4 - Start/Stop the Profiler

The tool needs to be **Started**... and when you it, the service counters are reset.

Each time the tool is started, it is the same as saying it is activated, and the activation can be given a name of your choice. This name will have appended a timestamp and be placed as part of the snapshot's identification in its header. If no value is provided, it defaults to the hostname and port number.

Since **v1.5**, if conditions are met, a **[Reset Counters]** button will be made available when the profiler is activated. This allows resetting the counters without having to stop the profiler and start it again.

- Settings & Options;

For screen space and organization reasons, the settings in this panel are distributed into tabs.

This panel commands the setting of some property-like settings and also drives the execution of available administration related options.

Some of the properties/options may require a server restart to take effect. These are identified by having the **ⓘ** icon by its side. After saving changes the icon starts glowing to indicate that the option is set but a restart is still required to make it effective.

Table 5 - Administration / Settings & Options



Setting	Description
Freeze Snapshot	<p>Take a snapshot of the current profiling data and hold it in memory, using it as cached value for the next snapshot requests.</p> <p>This setting allows performing all the Data Analysis over the same snapshot, in opposition to always getting a new snapshot every time an operation is performed or a refresh is requested.</p> <p>If activated, the tool continues to gather profiling information about the running Services, but when a snapshot is requested the one cached (<i>aka</i>, frozen) is returned.</p> <p>When the tool is Stopped, this option is automatically set ON to allow the analysis to continue working over the last know snapshot before the Stop action.</p> <p>When this setting is ON, an  icon is shown in the affected pages, working as a visual hint to the source of the data.</p> <p>If the icon is accompanied by an  icon, this means that the freeze was triggered by a snapshot loaded from an XML file.</p>
Clear generated export files	<p>Deletes all files generated as a consequence of the File Export operation with the Generate file & link option (<i>see Export To File, on page 36</i>).</p> <p>Each a file export of this type creates a file in the package's (outbound) area.</p> <p>Even though these files are automatically deleted every time the package is reloaded, this option allows deleting those files without having to reload the package.</p>
Override server name with	<p>The server name is part of the unique identification of the snapshot.</p> <p>This value is resolved from the network interface to a netname and a port, separated by a column character (':'). However, sometimes it may show as an unintelligible value, or even just an IP address.</p> <p>This setting allows you to override the resolved value with your own given value.</p>
Disable tool loading	<p>This option prevents the Service Profiler from loading its libraries when the Integration Server starts (<i>See Intentionally preventing the Profiler from loading, in page 13</i>).</p> <p>When this option is activated, the tool's menus are disabled and it has absolutely no effect over the hosting Integration Server.</p> <p>A server restart² is required to make the changes effective.</p>
Auto-start upon package (re)load	<p>If checked (and saved), the tool will be automatically started upon its package (re)load. When started, it will assume the activation name given in the Auto-started activation Name field.</p> <p>By default it is not checked, and the default Activation Name is AUTOSTARTED.</p>
Publish snapshot on shutdown	<p>If checked (and saved) and if the tool is started, the package unload/shutdown will trigger the publication of the current snapshot.</p> <p>No subscription and/or processing of this publication are implemented. It exists solely to give you a chance of saving the last state of the Service Counters before deleting it from memory. With this publication, it can be any persistence mechanism you can build, triggered by the subscription of the published document.</p>



Figure 5 - The Settings & Options panel tabs

- Package Exclusion Patterns;

While running, the **tool** establishes no filters: it collects info for all running Services, because they all contribute to your system performance.

However, these may not all be under your control or even the object of interest for your analysis. So, you can establish which packages you wish to rule out through **Regular Expression** patterns over the package names (the result of the applied pattern can be immediately checked, to avoid runtime expression evaluation errors).

² It will have to be a complete shutdown followed by a startup. The server restart function will not work properly because it does not perform a complete shutdown-and-startup sequence, thus not assuming reconfigurations.

Table 6 - Package Exclusion Patterns form fields

Field/Item	Description
New Pattern	New Regular Expression Pattern to add or test. When the [Save Changes] button is clicked this expression is added to the list.
Check	Click on the icon to see the list of packages it defines.
Remove	Indicate which Name Patterns are to be removed from the list by checking the corresponding checkbox. When the [Save Changes] button is clicked all checked expressions are removed from the list.
Disable	This checkbox allows disabling the evaluation of the pattern without actually having to remove it. This is very useful for temporarily removing the filter.

1

Define the Regular Expression you want to add.

2

Test the RE by checking which its result is.

3

The list of Package Names resulting from the RE is shown here.

4

Save it.

Package Exclusion Patterns

New pattern: W.*Demo\$

Remove

Name Pattern

Check

Disabled

☐

^Wm

☐

☐

^Wia[^P].*

☐

☐

^WiaServiceProfiler\$

☐

Save Changes

Package List (W.*Demo\$)

WiaServiceProfilerDemo

A pattern can be disabled without actually having to remove it.
The setting is effective after clicking [Save Changes].

The already defined REs can also be checked and/or selected for removal before clicking [Save Changes].

Figure 6 - Managing Package Exclusion Patterns

4.2 Licensing Pages

This functionality is only accessible to users associated with the **Administrators ACL**

The entry page shows the current licensing information (**Expiration Date**, **Status**, etc.) and can be used to set a new valid **License Key**.

ServiceProfiler > Licensing

• [Set New License Key](#)

• [Reset 'Services Top Volume' Counter](#)

Licensing Information

Licensed To

License Level

Expiration Date

Evaluation **Yes**

Status **OK**

Licensed Service Volume **100**

Services Top Volume **36**

Figure 7 - Licensing main page

IMPORTANT: Take notice that the pointed functionality option is **Set New License Key** and not **Edit License Key**. There is a difference: for the first, the current **License Key** is never shown.

The name of the customer for whom the License Key was issued to is also part of the license information.

If the license defines a limit to the number of allowed profiled services, the Licensed Service Volume value reflects the maximum number of services that are identified in the snapshots. The Services Top Volume is a count of how many services have been considered to the already taken snapshots, since the tool is up and running or since the last reset. This value is updated each time a snapshot is taken and it will be kept between start/stop cycles of the tool.

When the Services Top Volume value exceeds the Licensed Service Volume, an + icon is added to the first (see Figure 8, below). The count is an indication of the dimension of the universe of services being actually profiled, and also to help establish the adequate licensed value if an upgrade is required.

When the + icon appears, it means that not all individual services will be shown in the dashboards and this icon is assigned to the counters of those unlicensed services.

Licensing Information	
Licensed To	
License Level	
Expiration Date	
Evaluation	Yes
Status	OK
Licensed Service Volume	100
Services Top Volume	+ 146

Figure 8 - Licensed Service Volume breached

The Reset 'Service Top Volume' Counter option resets the counter.

4.3 View Per Service

The View Per Service dashboard page (see Figure 9, below) is a sample Analysis Tool that builds a view/report of the generated hierarchical snapshot as a flat representation, accumulating per Service.

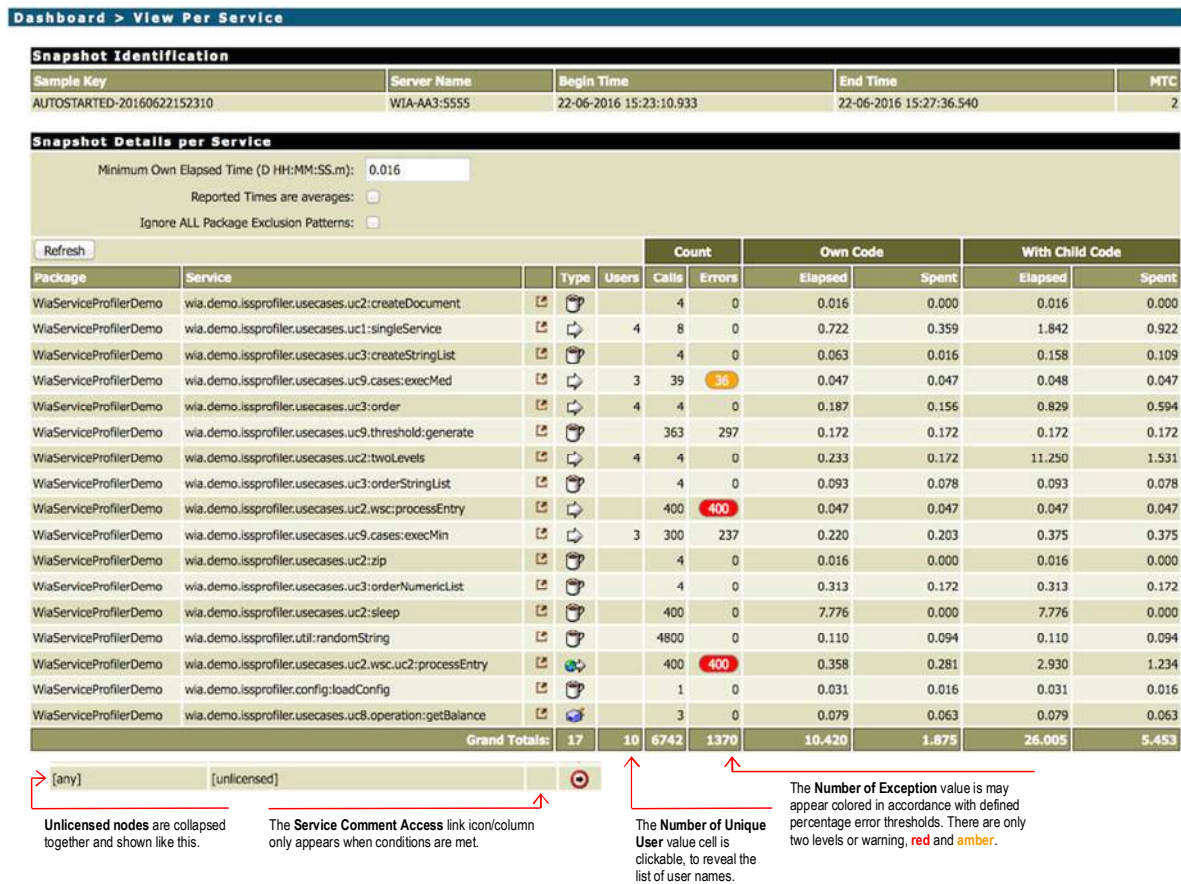


Figure 9 - The View Per Service report

The source gathered data is an invocation tree where the same Service may be called from different parents, but this particular view disregards the service interrelations and sums all values for each individually identified Service into a single accumulator set.

All timing values are displayed in the data format explained in Figure 10 (below) with the leading zeros suppressed with exception to time values smaller than one second.

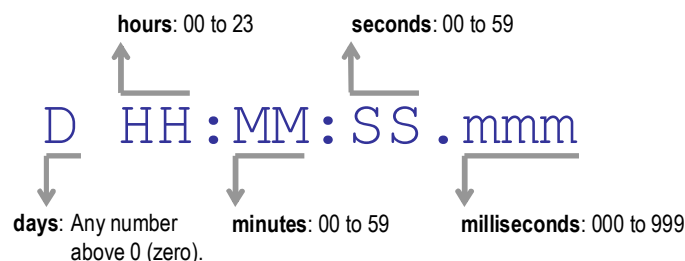


Figure 10 - Timing display format

The table can be sorted by any³ of the detail columns by clicking on the corresponding column header. Clicking multiple time toggles between ascending and descending sort order. Default (*first click*)

³ Except the Comments Viewer Access column which is only shown when conditions are met and has the same sorting value for all lines.

sorting order depends on the data type: numeric and time columns start by being sorted descending while the others are ascending.











The information is laid in two separate tables:

- One for the **Snapshot Header**;
This table contains data that identifies the snapshot.
- One for the **Snapshot Details**.
This table contains the information about each Service found in the snapshot, on an *one-service-per-line* layout.

Table 7 - View Per Service table for Snapshot Header

Snapshot Header	Description
Sample Key	A unique key that identifies the current snapshot. It reflects the Activation Name , if given when the tool was started (See <i>Administration Page</i> , on page 17).
Server Name	The net name of the Integration Server host, and its port.
Begin Time	The timestamp of when the profiling was started.
End Time	The timestamp of when the snapshot was requested.
MTC	Maximum Thread Count. This value contains the maximum number of threads that were used in parallel to execute the listed services. It is useful to give the user an idea of what percentage of defined Service Threads were (or are being) used during the profiling session. If the number of threads is equal, or close, to the maximum defined in the Integration Server , there may be services spending time waiting for a thread to become free.

Table 8 - View Per Service table for Snapshot Details

Snapshot Details	Description
Package	The name of the Package where the profiled Service is defined.
Service	The fully-qualified runtime name of the profiled Service.
Comment Viewer	No label on title of this column and it only appears if all conditions are met: <ul style="list-style-type: none"> The Service Comments Viewer is installed in this server; The snapshot is <u>not</u> a loaded XML. This column presents an  icon per line which is a clickable link directly to a new page that shows the corresponding service comments in a user readable manner.
Type	<p>The Service Type:</p> <ul style="list-style-type: none">  Flow Service  Java Service  Adapter Service  C/C++ Service  Web Service  XSLT Service⁴  Blaze Service  Warning! <p>Service name not found. This may happen if the package is disabled or the Service is renamed during the profiling period.</p> <p> Unlicensed count</p> <p>Aggregated counts for all found services that fall out of the Licensed Service Volume (see <i>Licensing Pages</i>, on page 19).</p> <p>The service type icon is also a link to the Browse Snapshot page (see page 27), where the occurrences of the corresponding service will be automatically highlighted.</p> <p>The link is made on the icon, and not on the Service column, to save horizontal space on the page: due to webMethods styling for links, their text appears as bold and this would widen considerably the Service table column.</p>
Users	<p>The number of distinct users that called the service.</p> <p>The number is only present for services that are <i>top-level-services</i>, i.e., are at the top of the call tree.</p> <p>The cell that contains the number is itself clickable. When clicked, a pop-up window is open with the list of user names.</p>
Call Count	<p>The accumulated number of times the Service has been invoked.</p> <p>The Service can be called from a number of other Services and has a Call Count for each of those calling nodes. However, this value sums all those counters.</p>

⁴ This kind of service was introduced with v6.5 of the **webMethods Integration Platform**.

Error Count	<p>The accumulated number of exceptions the Service has thrown.</p> <p>The Service can be called from a number of other Services and has an Exception Count for each of those calling nodes. However, this value sums all those counters.</p> <p>The value may be presented in a colored background, which is a visual alert to the reaching of an Error Threshold Percentage. If presented like 400, it has reached a red alert threshold. If presented like 101, it has reached an amber threshold.</p> <p>By default, the amber alert is reached when the percentage of error is 80% or more, to less than the red alert which is by default 100%.</p> <p>Not all services are checked for these thresholds and the thresholds themselves are configurable in properties (see <i>APPENDIX B</i> for details):</p> <ul style="list-style-type: none"> <code>issprof.alert.threshold.percentage.red</code> <code>issprof.alert.threshold.percentage.amber</code> <code>issprof.alert.threshold.service.exclude.patterns</code>
Own Code	<p>Timings for the profiled Service Own Code.</p> <p>This means that it does not include the time spent in Services it calls, only the time it took executing its own functionality code.</p>
With Child Code	<p>Timings for the profiled Service Own Code plus the time spent in Services it calls.</p> <p>The With Child... columns have defined a tip label showing the minimum and maximum timing values the corresponding Service took on a single call. Just place the mouse cursor over the table cell and the tip will appear for a short while.</p>
Elapsed	Clock time passed from the beginning of the call until it ends.
Spent	Actual time spent in the CPU doing work.

Additionally, there are filtering options that further limit the amount of data when the page is refreshed, by means of clicking on the **[Refresh]** button. These options are:

- **Minimum Own Elapsed Time;**
Do not show Services that have an **Own Elapsed Time** less than the established value. This allows you to concentrate the analysis only on the Services that take the longest... or significant timings.
- **Reported Times are averages;**
When checked, the values of **Elapsed** and **Spent** are the calculated averages for the **Call Count**.
- **Ignore ALL Package Exclusion Patterns.**
A shortcut option that, without changing the **Package Exclusion Patterns** settings, allows ignoring it and show all collected services with a simple refresh.

4.4 Package Coverage

The **Package Coverage**⁵ report (*Figure 11, below*) is another example of an **Analysis Tool**.

It presents a view over the **Snapshot** data, reporting the percentage of **Services** in a **Package** that have effectively been run:

- While the profile was active;
The results are based solely on the number of services for each package present in the snapshot against the universe of services defined by their respective packages. From this, the percentage of services used per package is calculated.
This is the default view, if a snapshot from the **Service Profiler** is available.
- Since the **Integration Server** was started.
The results are based on the **Integration Server**'s service usage statistics.

⁵ This report was known as **Code Coverage** in versions of **Service Profiler** prior to v1.4.

This is the default view, if a snapshot from the [Service Profiler](#) is not available. In this case the [Base coverage analysis on current server's usage statistics](#) option is automatically selected and cannot be changed.

Check the [Base coverage analysis on current server's usage statistics](#) option and press [\[Refresh\]](#) to change to this view.

In this view, the [Snapshot Identification](#) table is removed, because the information source is not a snapshot, but a link to a [Service Usage Statistics](#) page is added to the top of the page. This page is simplified alternative view of the servers own service usage page, but where the package name is added to the table and it can be sorted by any of the columns.

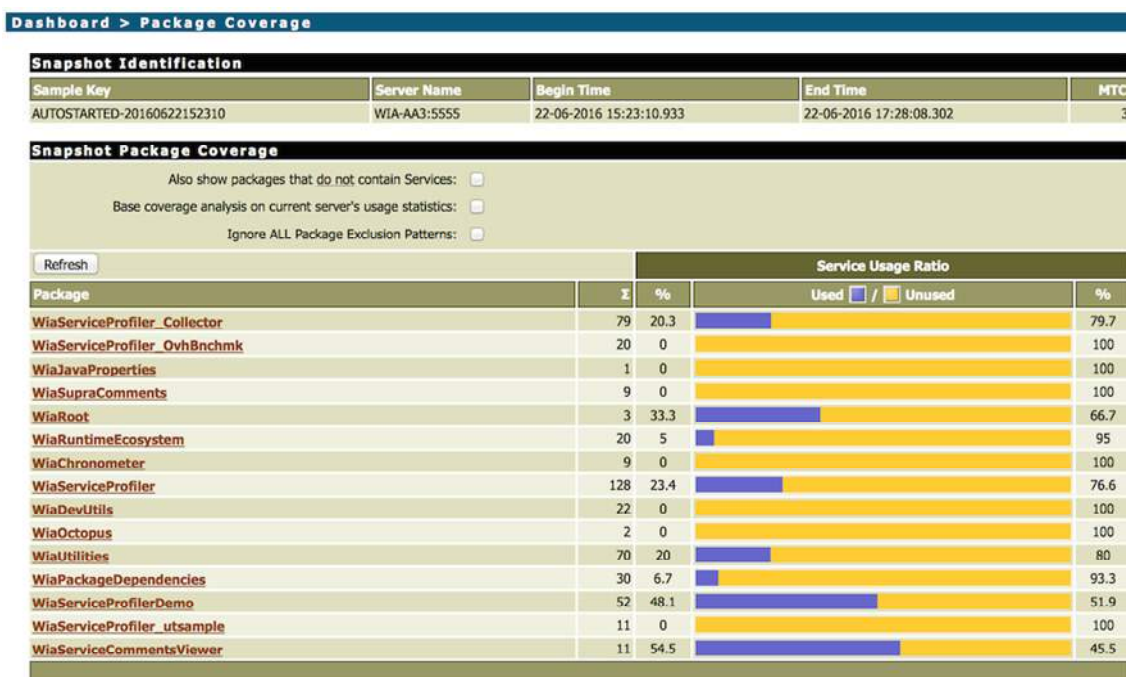


Figure 11 - The [Package Coverage](#) report – Snapshot View

The table can be sorted by clicking on the corresponding column header on any of the detail columns, with exception to the percentage bar. Clicking multiple times toggles between ascending and descending sort order.

Each package name (that contains Services defined) is presented as a link to a new page where the complete list of Services from that package is presented, together with an indication on whether is has been used/invoked or not while the profiler was [Active](#) (see [Figure 12](#), below).

Additionally, there are filtering options that change the amount of data when the page is refreshed, by means of clicking on the [\[Refresh\]](#) button. The options are:

- [Also show packages that do not contain Services.](#)

When checked, the entire list of packages, even if they do not have any Services defined, is shown.

This is just a simple option to allow viewing the entire universe of Package names. The Packages that do not contain Services are not available as links for drilling-down.

- Ignore ALL Package Exclusion Patterns.

A shortcut option that, without changing the **Package Exclusion Patterns** settings, allows ignoring it and show all collected services with a simple refresh.

Dashboard > Package Coverage > Package Services

[Back to Package Coverage](#)

Services From Package 'WiaServiceProfilerDemo'		
Service Name	Used?	
wia.demo.issprofiler.about:getInfo	Yes	
wia.demo.issprofiler.about:satelliteToolInfo	Yes	
wia.demo.issprofiler.admin:initialize	Yes	
wia.demo.issprofiler.admin:startup	Yes	
wia.demo.issprofiler.config:get	Yes	
wia.demo.issprofiler.config:list	Yes	
wia.demo.issprofiler.config:loadConfig	Yes	
wia.demo.issprofiler.config:set	Yes	
wia.demo.issprofiler.ui.about:getMetadata	Yes	
wia.demo.issprofiler.ui.run_uc:getMenuMetadata	Yes	
wia.demo.issprofiler.ui.run_uc:getUseCasesMetadata	Yes	
wia.demo.issprofiler.ui.run_uc:triggerUseCase	Yes	
wia.demo.issprofiler.usecases.uc1:looping	Yes	
wia.demo.issprofiler.usecases.uc1:singleService	Yes	
wia.demo.issprofiler.usecases.uc2.wsc.uc2:processEntry	Yes	
wia.demo.issprofiler.usecases.uc2:createDocument	Yes	
wia.demo.issprofiler.usecases.uc2:looping	Yes	
wia.demo.issprofiler.usecases.uc2:random	Yes	
wia.demo.issprofiler.usecases.uc2:random	Yes	

Figure 12 - The Package Coverage service usage detail

Dashboard > Package Coverage > Service Usage Statistics

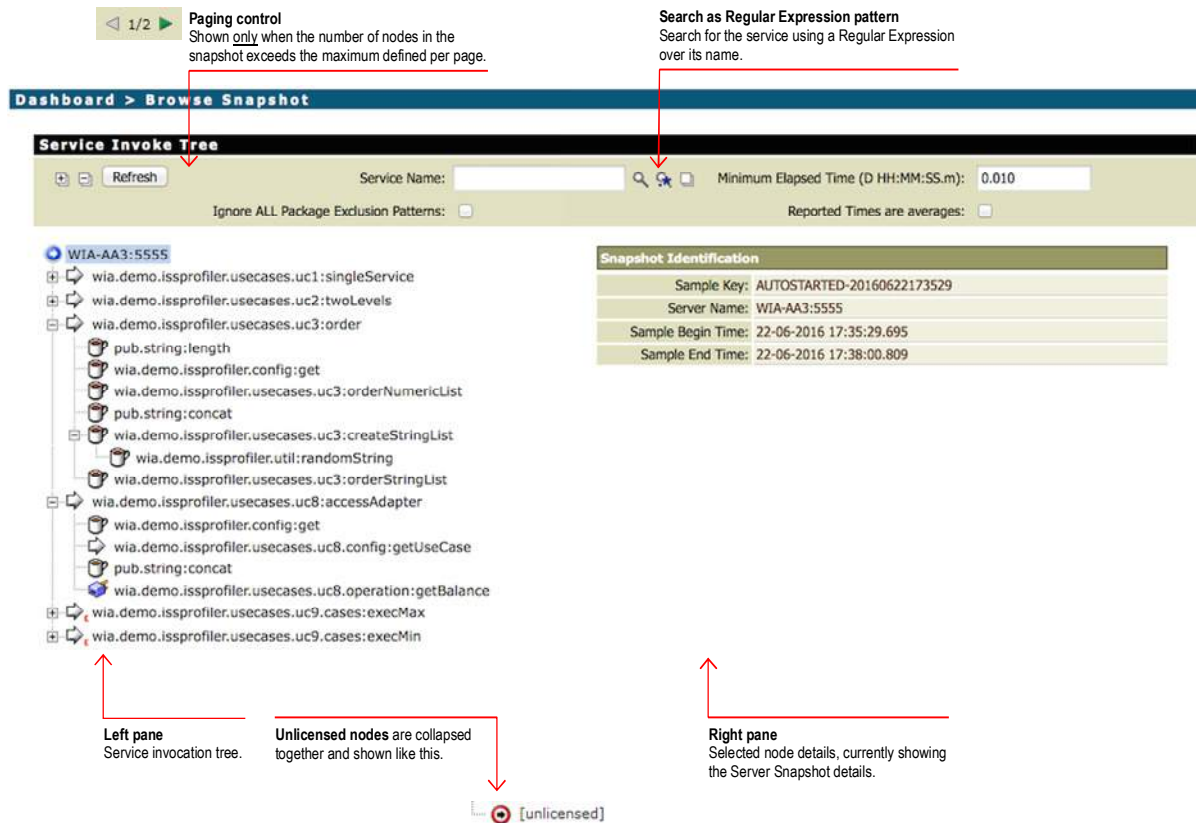
[Back to Package Coverage](#)

Server Statistics		
Package Name	Service Name	Last Ran
WiaServiceProfiler	wia.pub.issprofiler.ui.util:getStyleMetadata	15-06-2016 18:48:20.000
WiaRoot	wia.util.ui:getStyleMetadata	15-06-2016 18:48:20.000
WiaUtilities	wia.util.version:isEqualOrGreater	15-06-2016 18:48:20.000
WiaServiceProfiler	wia.issprofiler.admin:getStatus	15-06-2016 18:48:15.000
WiaServiceProfiler	wia.issprofiler.data:getConstants	15-06-2016 18:48:15.000
WiaServiceProfiler	wia.issprofiler.pkg_exclusion:getActivePatterns	15-06-2016 18:48:15.000
WiaServiceProfiler	wia.issprofiler.util:getFilteredPackageNames	15-06-2016 18:48:15.000
WiaServiceProfiler	wia.pub.issprofiler.analyze:packageCoverage	15-06-2016 18:48:15.000
WiaServiceProfiler	wia.pub.issprofiler.ui.packageCoverage:build	15-06-2016 18:48:15.000
WiaServiceProfiler	wia.pub.issprofiler.ui.packageCoverage:getServicesWithUsage	15-06-2016 18:48:15.000
WiaServiceProfiler	wia.pub.issprofiler.ui.packageCoverage:setAsReport	15-06-2016 18:48:15.000
WiaUtilities	wia.util.dsp:checkboxBooleanValue	15-06-2016 18:48:15.000
WiaUtilities	wia.util.list:packageServices	15-06-2016 18:48:15.000
WiaUtilities	wia.util.service:getPackageName	15-06-2016 18:48:15.000
WiaServiceProfiler	wia.pub.issprofiler.ui.serviceUsageStatistics:build	15-06-2016 18:48:11.000
WiaServiceProfiler	wia.pub.issprofiler.ui.serviceUsageStatistics:setAsReport	15-06-2016 18:48:11.000
WmPublic	pub.flow:clearPipeline	15-06-2016 18:41:13.000
WmPublic	pub.xml:xmlNodeToDocument	15-06-2016 18:41:13.000
WmPublic	pub.xml:xmlStringToXMLNode	15-06-2016 18:41:13.000
WiaServiceProfiler	wia.issprofiler.api.snapshot:toDocument	15-06-2016 18:41:13.000
WiaServiceProfiler	wia.issprofiler.api.getSnapshotStream	15-06-2016 18:41:13.000
WiaServiceProfiler	wia.issprofiler.data.freeze:isFrozen	15-06-2016 18:41:13.000
WiaServiceProfiler	wia.issprofiler.data.loaded:getStatus	15-06-2016 18:41:13.000
WiaServiceProfiler	wia.issprofiler.data.snapshot:getCurrent	15-06-2016 18:41:13.000
WiaServiceProfiler	wia.issprofiler.data.snapshot:getCurrent	15-06-2016 18:41:13.000

Figure 13 - The Package Coverage service usage statistics detail

4.5 Browse Snapshot

This **Analysis Tool** simply shows the Snapshot tree of called Services.



Paging control
Shown only when the number of nodes in the snapshot exceeds the maximum defined per page.

Search as Regular Expression pattern
Search for the service using a Regular Expression over its name.

Dashboard > Browse Snapshot

Service Invoke Tree

Refresh Service Name: Minimum Elapsed Time (D HH:MM:SS.m): 0.010

Ignore ALL Package Exclusion Patterns: Reported Times are averages:

WIA-AA3:5555

- wia.demo.issprofiler.usecases.uc1: singleService
- wia.demo.issprofiler.usecases.uc2: twoLevels
- wia.demo.issprofiler.usecases.uc3: order
 - pub.string.length
 - wia.demo.issprofiler.config.get
 - wia.demo.issprofiler.usecases.uc3: orderNumericList
 - pub.string.concat
 - wia.demo.issprofiler.usecases.uc3: createStringList
 - wia.demo.issprofiler.util.randomString
 - wia.demo.issprofiler.usecases.uc3: orderStringList
 - wia.demo.issprofiler.usecases.uc8: accessAdapter
 - wia.demo.issprofiler.config.get
 - wia.demo.issprofiler.usecases.uc8.config: getUseCase
 - pub.string.concat
 - wia.demo.issprofiler.usecases.uc8.operation: getBalance
- wia.demo.issprofiler.usecases.uc9: cases: execMax
- wia.demo.issprofiler.usecases.uc9: cases: execMin

Snapshot Identification

Sample Key:	AUTOSTARTED-20160622173529
Server Name:	WIA-AA3:5555
Sample Begin Time:	22-06-2016 17:35:29.695
Sample End Time:	22-06-2016 17:38:00.809

Left pane
Service invocation tree.

Unlicensed nodes are collapsed together and shown like this.

Right pane
Selected node details, currently showing the Server Snapshot details.

[unlicensed]

Figure 14 - The Browse Snapshot page

Placing the mouse cursor over the node name will show a tip with context summarized information. By clicking on the node name, contextual detail information is shown in the panel on the right:

- The **Integration Server** node stems snapshot identification data (see [Figure 14](#), above);
The nature of this information is the same as the one presented on the other **Analysis Tools**.
- A service node stems details about that Service in that calling context (see [Figure 15](#), below);
The **Accumulated With Children** table presents timings that include the service own timing plus the timings of all the services in its child nodes.
An **Aggregated Count** value may also appear in the contextual detail information if the **Licensed Service Volume** as been surpassed and the node is an aggregation of all service counts below the parent service.

- If the service has any child nodes, the **Direct Child Nodes Percentage(s)** table is shown (see *Figure 16, below*).

This table presents the elapsed timing percentages for each of those child services over the total timings of the direct children, *i.e.* excluding current service own code timings:

- ▷ The **Elapsed** percentage if over the sum of elapsed times of all current child nodes;
- ▷ The **Spent** percentage if over the elapsed time of that particular child node.

For instance, for a given child node, 50% elapsed and 10% spent means that the elapsed time of that node accounts for 50% of the sum of elapsed times of all current child nodes, and that the spent time accounts for 10% of the elapsed time for that given node.

Or, in other words, 50% of the all the children elapsed time belongs to that service and 10% of that was spent in the **CPU**.

The accuracy of the absolute values is not totally guaranteed by the underlying infrastructure and some precision is lost when converting the nanoseconds of spent time to milliseconds.

Some precision is also lost when crunching those values to a 3 decimal places percentage.

So, when a 0% value is presented it does not absolutely state a 0 (*zero*) timing but rather a negligible value, *i.e.* one that has no real expression or weight in the relativity of its counterparts.

The paging control is only shown if the number of nodes in the snapshot exceeds the maximum defined per page (*for more information please read section [Timeout or long-running script alert on browser](#), on page 49*).

Service			
Package:	WiaServiceProfilerDemo		
User(s):	wia_scheduled_task, health_probe, sandra.cox, paul.smith		
Call Count:	22		
Exception Count:	0		
Documentation :	view service comments		

The list of users is only shown on the top-level services.

Own Code			
Elapsed:	0.234		
Spent:	0.203		

The link to the **Service Comments Viewer** is only shown if conditions are met.

Accumulated With Children:		Minimum	Maximum
Elapsed:	0.515	0.015	0.047
Spent:	0.484	0.016	0.047

The **minimum & maximum** values timed on a single service call.

Includes the sum of the Service's **Own Code** values with the values of all its child nodes.

Figure 15 - The **Browse Snapshot** example of detail for a selected Service tree node

There are no sorting options: the root nodes are always ordered ascending.

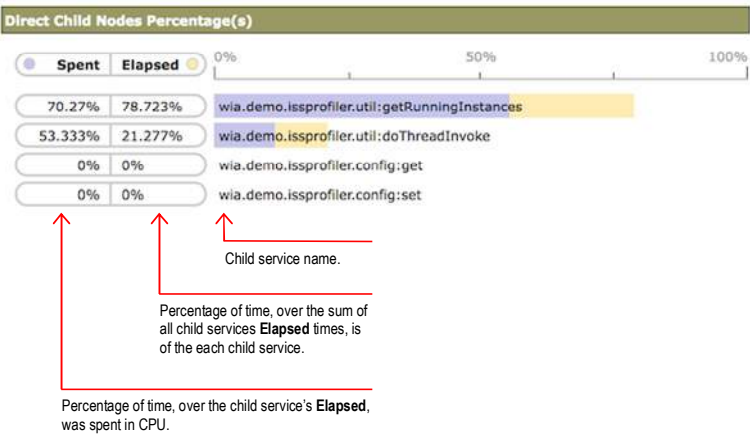







Figure 16 - The Browse Snapshot example of child node bar graph for a selected Service tree node



The Package Exclusion Patterns (see Administration Page, on page 17) and the Minimum Elapsed Time filtering options are only applied to the root nodes.

Table 9 - Snapshot Browser options

Option	Description
	Expand all tree nodes.
	Collapse all tree nodes.
Service Name	Locates all occurrences of a service name in the call tree.
	Locates all occurrence of a fully qualified service name.
	Locates all occurrence of a service in the given the Regular Expression entered in the Service Name text box.
	Clear all highlighted tree nodes (does not deselect any currently selected tree node).
Minimum Elapsed Time	Applied only to root services. Only shows root nodes for which the Elapsed Time is above the stated value. The filter is applied by pressing the [Refresh] button.
Ignore ALL Package Exclusion Patterns	A shortcut option that, without changing the Package Exclusion Patterns settings, allows ignoring it and show all collected services with a simple refresh.
Reported Times are averages	When checked, the values of Elapsed and Spent are the calculated averages for the Call Count.

On the tree nodes, which represent Service Calls, there may appear some visual hints overlaid to the node icon that give it some extra meaning. These tree node visual hints are explained in Table 10 (below).

Table 10 - Snapshot Browser node icons visual hints

Tree Node Hint	Description
	<p>False root.</p> <p>This can only occur on the node that is representing a Top Level Service or Root Service, i.e., a Service at the top of the tree.</p> <p>A False root occurs when the Service Profiler is started, a service running path is already on the run and the first collected data happens in the middle of the call stack: for the Service Profiler this is a root because its has no recollection of the services up in the call stack. However, it is recognizably not a true Top Level Service because its parent is not null.</p>
	<p>This hint indicates that that Service has raised exceptions. Select it to view its details, where an exception count is also presented.</p>

IMPORTANT: The **View Per Service** reports accumulated timings per service independently from its position in the calling tree. This may induce timing differences for a specific node by comparison because that service may be called by different parents which may even be currently filtered out.

IMPORTANT: Some service nodes that are presented in the root may in fact not be top-level services. They may happen to be on the root node just because they were first scanned after the time when the profiler was started.

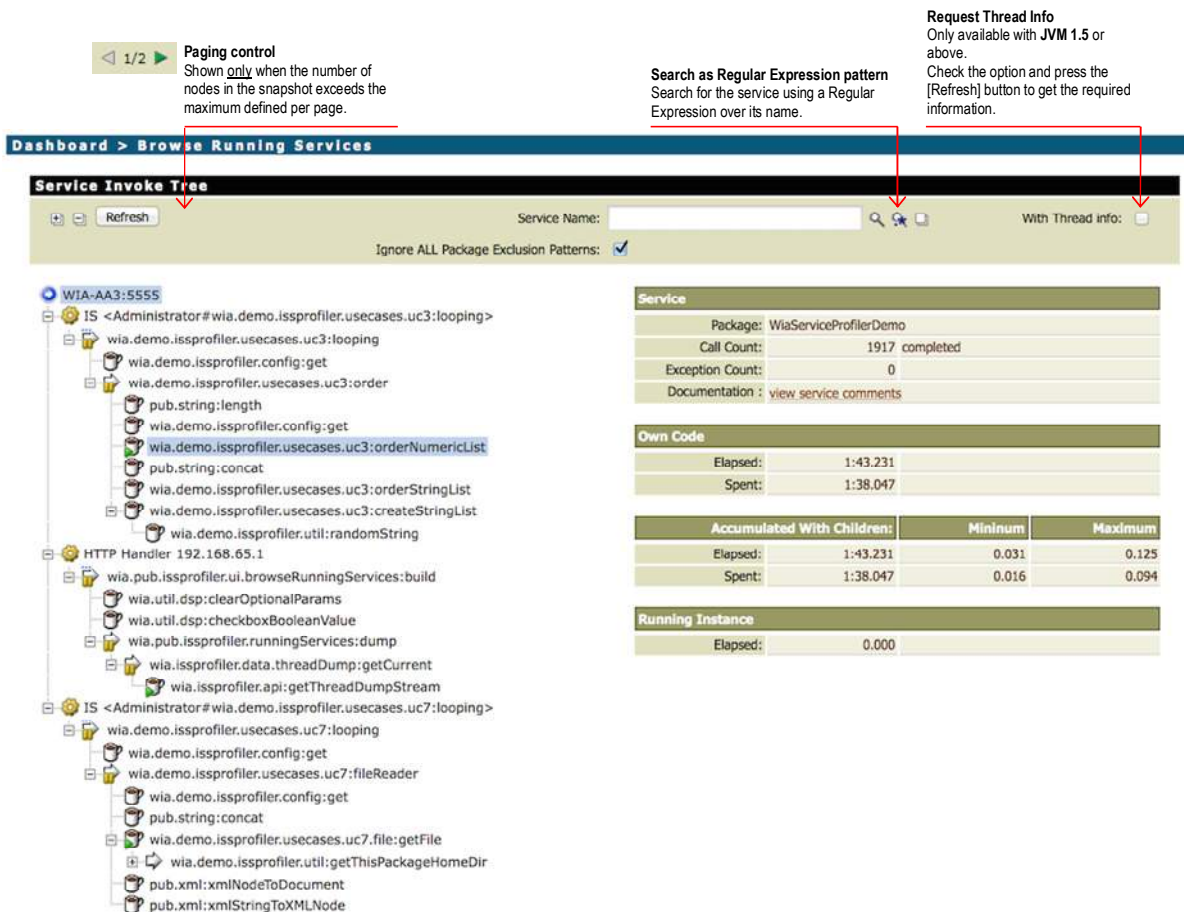
4.6 Browse Running Services

The **Browse Running Services** dashboard is similar to the **Browse Snapshot** in format, but not in content.

Paging control
Shown only when the number of nodes in the snapshot exceeds the maximum defined per page.

Search as Regular Expression pattern
Search for the service using a Regular Expression over its name.

Request Thread Info
Only available with JVM 1.5 or above.
Check the option and press the [Refresh] button to get the required information.



Service

Package:	WiaServiceProfilerDemo
Call Count:	1917 completed
Exception Count:	0
Documentation:	view service comments

Own Code

Elapsed:	1:43.231
Spent:	1:38.047

Accumulated With Children:

	Minimum	Maximum
Elapsed:	0.031	0.125
Spent:	0.016	0.094


Running Instance

Elapsed:	0.000
----------	-------

Figure 17 - Browse Running Services dashboard

Unlike all the other dashboards, which show data about services that have already finished, this dashboard shows the tree of services currently running where the 1st level node is the thread it is running in. Only when the thread's top level service exits are the entire branch service counts added to the snapshots shown in the other dashboards. That is why this dashboard completes the profiling services view: it allows checking how many **Service Threads** are being used, which service path is being executed in each on them, etc.

The **Browse Running Services** dashboard shares the same service search features available for the **Browse Snapshot**, as described in [Table 9 \(page 29\)](#), and the contextual detail information is also similar, but with one singular difference:



- A group of information identified as **Running Instance**.
This group of information is only shown is the selected service is the running instance, *i.e.* it is the service that is currently (at the time the snapshot was taken) on the top of the call-stack. It is visually identified by having  over its icon.
The **Elapsed** value indicates the time that has been elapsed since the service was invoked.

Much like for the other dashboards, the counts for the services involved in the current execution path are only updated when they finish. These specific services are identified by visual hints overlaid to the node icon, and are explained in the [Table 11](#), below. This dashboard also presents the visual hints described in [Table 10](#) (page 30).

This said, there are some specific characteristics about this dashboard snapshot that further distance it from the others:

- Service call count of 0 (zero);
The service call count is only incremented when the call is completed and returns the control back to the caller. This is also true for the timings and other counts.
So, the displayed call count value, exception count, elapsed time, etc., for each service is only for calls that have already finished.
When the service is first called, and is still on the thread call-stack, its call count is 0 (zero).
- The [Package Exclusion Patterns](#) is only applied to the top-level services;
In fact, this is also the case for the [Browse Snapshot](#) dashboard.
- This dashboard snapshot is not affected by the [Freeze Snapshot](#) setting.
So, every time the page is loaded, or the [\[Refresh\]](#) button is clicked, a fresh snapshot of the threads is always taken.

Table 11 - [Browse Running Services](#) node icons additional visual hints

Tree Node Hint	Description
	This hint indicates that the Service is part of the thread call-stack. It is not the service currently running but it is on the call path and has itself called another service.
	The node with this hint is the Service actually running within the thread. It is the service that is currently (at the time the snapshot was taken) on the top of the call-stack.

Like with other dashboards, there are some options that change the amount of data when the page is refreshed, by means of clicking on the [\[Refresh\]](#) button. The options are:

- [With Thread info](#)
If the JVM being used is v1.5 or above, additional thread information can be requested, including [Java Stack Trace](#) and lock monitor information. When the [With thread info](#) checkbox is checked, pressing the [\[Refresh\]](#) button gets a (new) snapshot with the thread information is added to it (see [Figure 18](#), below). Because this option has a slightly higher performance impact on the running services, it is unchecked by default.
- [Ignore ALL Package Exclusion Patterns](#).
A shortcut option that, without changing the [Package Exclusion Patterns](#) settings, allows ignoring it and show all collected services with a simple refresh.

IMPORTANT: It is important to point out that the viewed information is valid for the moment the snapshot was taken. So, for instance in case of simple blockage, the status may be transient and when viewed it may already have been changed.

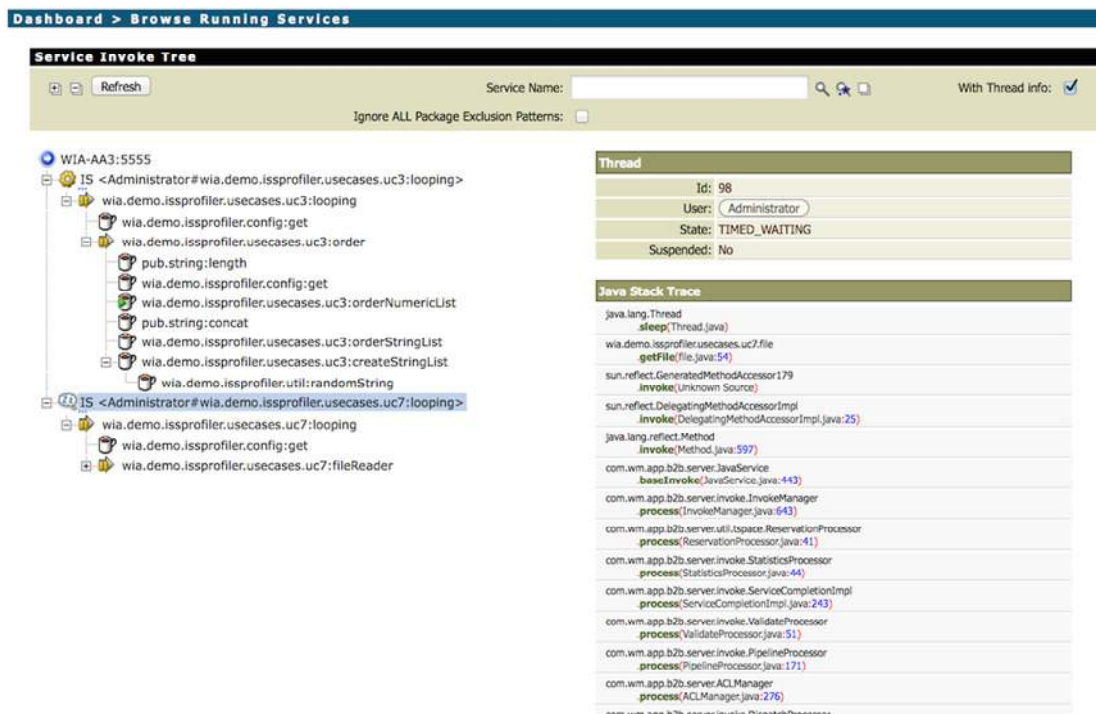








Figure 18 - Browse Running Services with thread info

When the **With thread info** option is used, the thread name link on the tree (left pane) changes from its default behavior (expanding/collapsing the node) to show thread details on the right pane. Additionally, the thread node icons suffer changes to visually reflect some (not all, but what can be considered important) state information.

Table 12 - Browse Running Services thread icons when **With thread info** option

Tree Node Hint	Description
	The thread is running normally (Runnable) or no detail information about the threads was requested.
	The thread is blocked (Blocked) by the thread info gathering process. The lock is only for the duration of the information gathering and it is now already released. The detail panel contains information about the blocker, and if it is a thread in the current snapshot a link is available to directly locate it in the tree.
	The thread is blocked by another (Blocked). The detail information contains information about who is blocking, and if it is a thread in the current snapshot makes a link available to directly locate it in the tree.
	The thread is not only blocked. It is actually involved in a deadlock.
	The thread is suspended.
	The thread is waiting, either that some time has passed (Timed_Waiting) or that a notification happens (Waiting).

When the thread is blocked, a specific block of information is placed the detail pane including the identification of its owner. If the block owner is a **Service Thread** that is part of the current snapshot, the thread Id is transformed into a link that jumps directly to its node in the tree (see [Figure 19](#), below).

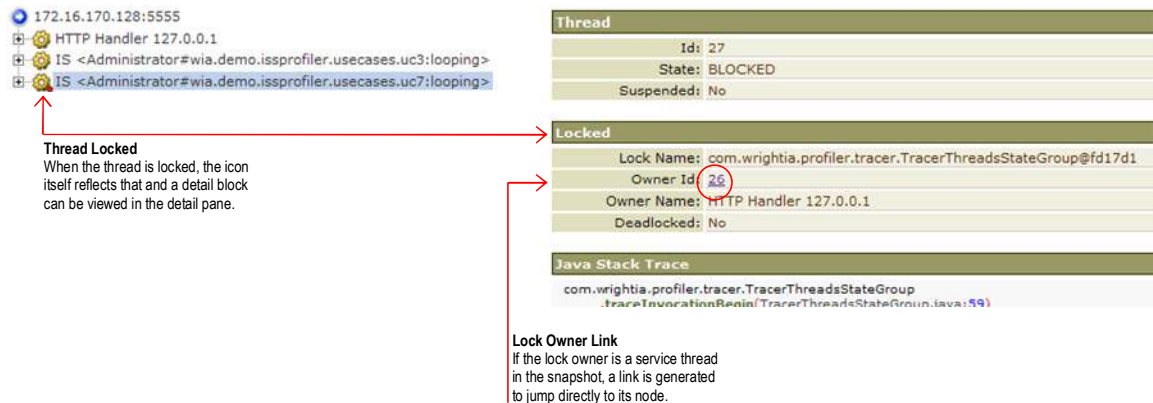


Figure 19 - Thread lock detail info

4.7 View Per User

The **View Per User** dashboard provides a perspective over the relationship between the called services and the users that call them. The dashboard does not provide detail counts per user, which is not possible due to the cumulative nature of the snapshots, but rather a usage profile of the services by universe of users.

The provided dashboard allows the definition of an importance hierarchy for the called services while also helping on impact analysis and test planning when services need to be changed, replaced, moved, *etc.*

This dashboard is comprised of two views, each in its own tab:

- **By User**
In this view the information is organized based on the user and which services it has directly called.
- **By Service**
In this view the information is organized based on the services directly called by users and which users have made those calls.

The list of services considered in this dashboard is only of the real top level services, *i.e.* the **False Root** services are not included.

With exception to the **Service Usage Ratio** and **Expand/Contract** columns, the tables in this dashboard can be sorted by any column.

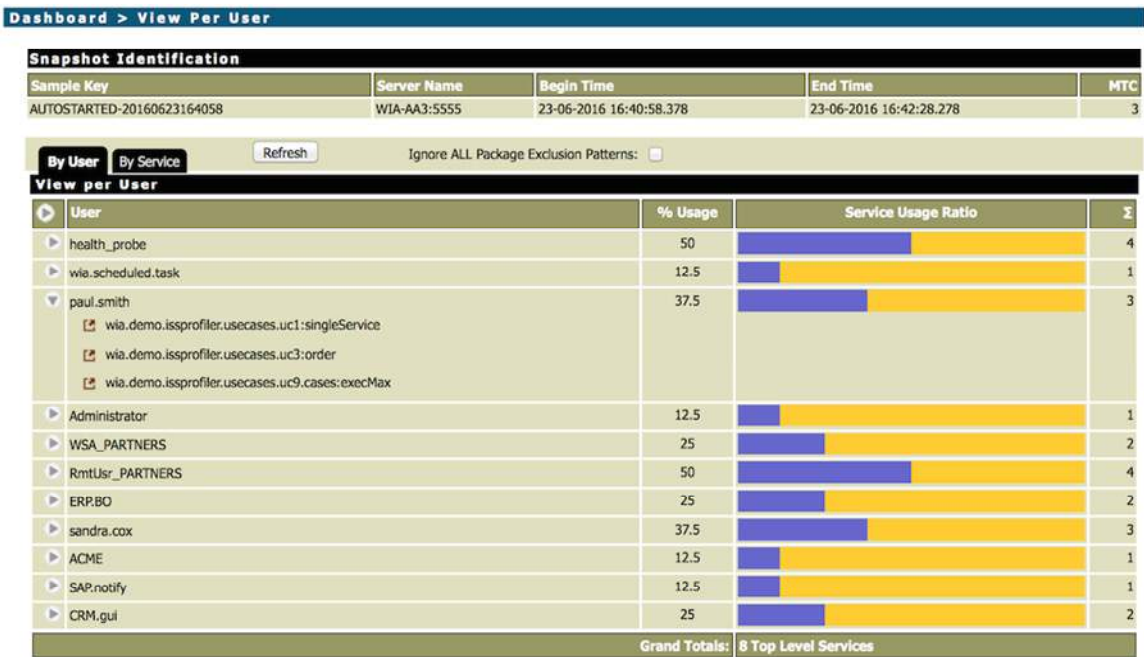






Figure 20 - View Per User dashboard - By User

Table 13 - View Per User table for By User

By User	Description
	This column contains a clickable icon that expands or contracts the list of services for the users. The icon placed at the column headed does the same operation but for all the row/users at once. The icon toggles between  and  to indicate whether to expand or to contract.
User	The user name. If detail is expanded, it reveals the list of services directly called by that user. The  icon right before the service name is a clickable link directly to a new page that shows the corresponding service comments in a user readable manner, but only appears if all conditions are met: <ul style="list-style-type: none">The Service Comments Viewer is installed in this server;The snapshot is not a loaded XML.
% Usage	The percentage of services used by this user in the universe of considered services.
Service Usage Ratio	Just a graphical way of representing the % Usage column value.
Σ	The number of services used by this user.

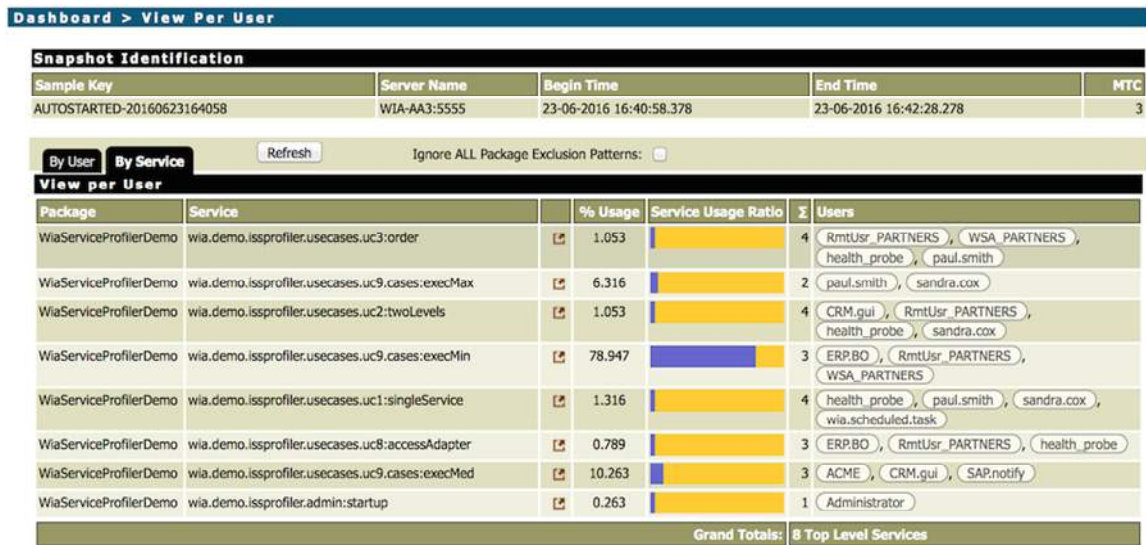



Figure 21 - View Per User dashboard - By Service

Table 14 - View Per User table for By Service

By User	Description
Package	The name of the package the service belongs to.
Service	The service name.
Comment Viewer	<p>No label on title of this column and it only appears if all conditions are met:</p> <ul style="list-style-type: none"> The Service Comments Viewer is installed in this server; The snapshot is <u>not</u> a loaded XML. <p>This column presents an  icon per line which is a clickable link directly to a new page that shows the corresponding service comments in a user readable manner.</p>
% Usage	The percentage of calls of this service as a top-level service in the universe of all top-level service calls.
Service Usage Ratio	Just a graphical way of representing the % Usage column value.
Σ	The number of users that directly called this service.
Users	The list of users that made the top-level calls.

Like with other dashboards, there are some options that change the amount of data when the page is refreshed, by means of clicking on the **[Refresh]** button. The available options are:

- Ignore ALL Package Exclusion Patterns.

A shortcut option that, without changing the Package Exclusion Patterns settings, allows ignoring it and show all collected services with a simple refresh.

4.8 Export To File

This functionality allows exporting the current Snapshot to a file.

When you choose the file format/type, adequate options appear corresponding to that file format/type.

When the **[Execute]** button is clicked, the file generation process is started. Where the file is generated depends on kind of generation selected:

- Stream to download;

The generated file is streamed directly to the browser.

A dialog box is open to define where the file should be locally created. A default file name is automatically suggested, but (depending on the used browser) you can give it a name of your choice.

- **Generate file & link.**

The file is generated in the server file system and a link is generated to access it.

The link is intended to be used with the *Save as...* option of the browser, to copy it to your local disk.

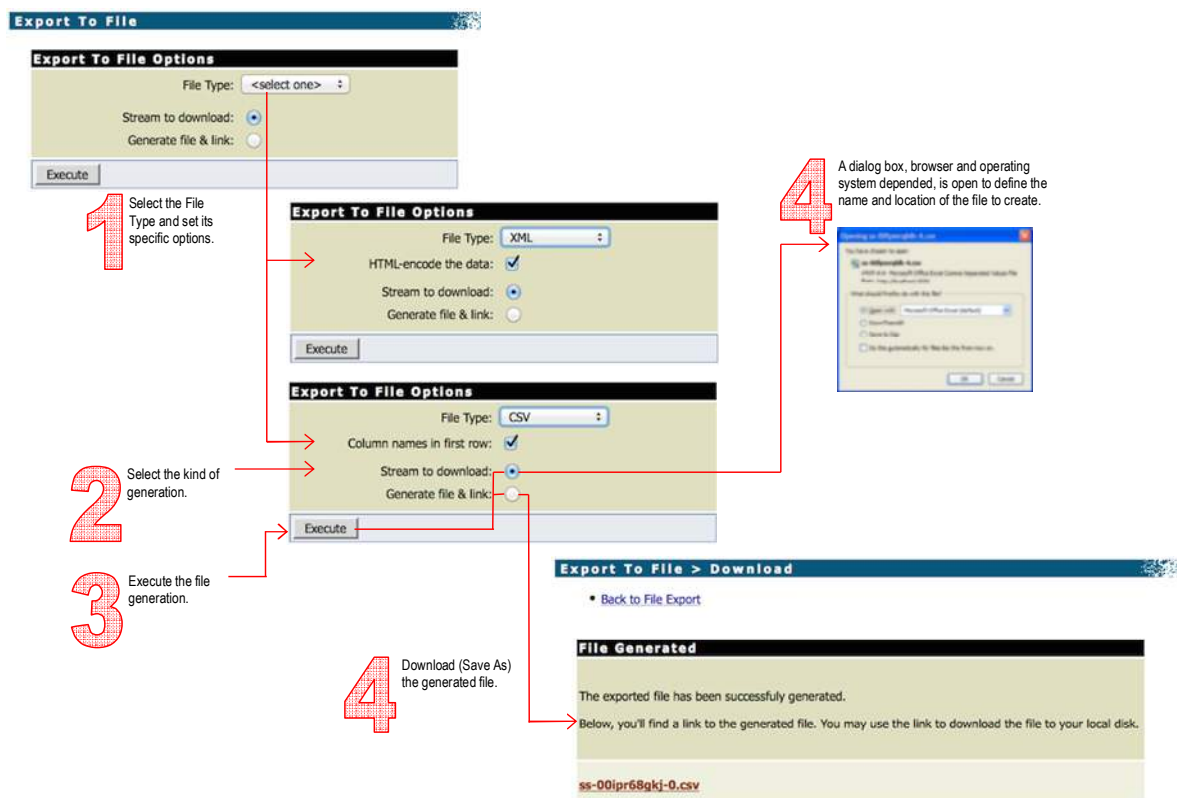


Figure 22 - Exporting Snapshot as a file

4.8.1 CSV Format

The standard **CSV (Comma Separated Values)** format is widely known but still leaves some minor details for the implementation. Therefore, the **Service Profiler** implementation fixes these rules:

- The value separator is always the comma (",");
- The **Service Name** includes the package name as a prefix separated by a forward-slash ("/");
For example: `WiaServiceProfiler/wia.pub.issprofiler.analyze:viewPerService`
- Only values that include the value separator are quoted;
When this happens the value is enclosed in double-quotes.
- Header names are not quoted;
Header names are optional, and are not quoted in accordance with the rule to quote values.

- The record separator used is dependent of the **Operating System** the **Integration Server** is running under;
The record separator is the new-line sequence used for normal text files, following the rules for the hosting **Operating System**.
- The value for **Users** contains a list of user names.
Each name in the list is separated by a semi-column (" ; ").
- Column header names are:
Node Id
Parent Node Id
Sample Key
Server Name
Sample Begin Time
Sample End Time
Max Thread Count
Service Name
Calling Service Name⁶
Call Count
Exception Count
Elapsed milliseconds
CPU nanoseconds
Max Elapsed milliseconds
Min Elapsed milliseconds
Max CPU nanoseconds
Min CPU nanoseconds
Users

4.8.2 XML Format

The produced **XML** is syntactically formatted according to standard rules, which includes starting the file with the line:

```
<?xml version="1.0" encoding="UTF-8"?>
```

The one specificity that the produced **XML** contains is the used dictionary. Because the **API** to the core functions already uses **XML** to provide the Snapshot, the same structure is used here, both for simplicity and enhanced performance.

As an option, the data values can be **HTML**-encoded entities, *i.e.*, where values contain characters that are used by the tagging rules or may create incompatibilities these characters are encoded in the form `<code>`. Depending on the application that will be the target of the produced **XML**, decoding these entities may be automatic or not.

⁶ The **Calling Service Name** is only filled for top-level-services. It is used to detect **False Root** (See the *Glossary* for details).

Table 15 - Snapshot XML dictionary

Tag	Level	Attribute	Comment
service-counters	0		Main enclosing tag.
		version	Version of the snapshot XML structure.
		sampler-lifecycle	Internal information.
		sampler-name	Internal information.
		sample-key	Snapshot ID.
		server-name	Integration Server net-name (or IP address) and port number.
		sample-max-thread-count	The top count of threads that were used simultaneously.
		sample-begin-time	Timestamp of when the profiler started collecting data, formatted as "dd-MM-yyyy kk:mm:ss.SSS".
		sample-end-time	Timestamp of when the Snapshot was taken formatted as "dd-MM-yyyy kk:mm:ss.SSS".
		sample-max-thread-count	The maximum number of simultaneous service threads used during the collection period covered by this snapshot, i.e. to execute all included services no more than this number of threads were required.
invocation	1 .. n		
		service	Name of the Service. It contains the name of the Package has a prefix separated by a forward-slash, for example: <code>MyPackage/MyAPP.util:getMaxValue</code>
		calling-service	Name of the service that called this one. Its format is the same as for the field <code>service</code> . This seems redundant, but it is not. It is just additional information that is <u>only relevant for the root invocations</u> . A root invocation is called directly by the invoker and should have no calling service. However, the service profiler may be started while services are already running and these become the registered root invocations of the snapshot. When this happens, the actual root invocation is not known because it has not been intercepted, but the name of the service that came before in the calling stack can be known and becomes the calling service for this root. When a root invocation has a calling service, it is not a real root invocation and becomes known as a False Root .
		service-type-id	The type of service as referenced in the <code>metadata/service-type</code> element with the corresponding <code>type-id</code> attribute.
		call-count	Number of times this Service was called... in the context of this call path node.
		exception-count	Number of time this Service raised an exception.
		elapsed-ms	Sum of the elapsed milliseconds for the calls in the context of this call path node.
		cpu-ns	Sum of the CPU spent nanoseconds for the calls in the context of this call path node.
		min-elapsed-ms	Reference value. The minimum timed value on a single service call.
		min-cpu-ns	
		max-elapsed-ms	Reference value. The maximum timed value on a single service call.
		max-cpu-ns	
		unlicensed	If present and with value <code>true</code> , this service node represents the accumulation of all child nodes that, at this level and count, already exceed the service profiler license settings.
		aggregated-count	If present and with value <code>true</code> , this node values are an aggregation of a set of child nodes that otherwise would be presented in detail.
		user-names	List of users that called this service. This list is only filled for root invocations.
child-invocations	n+1		If defined, contains the invocations to Services from the current Service.
invocation	Recursive...
metadata			If defined, contains metadata about the services in this snapshot.
service-type	1-n		Reference data for the service types. The list of service types is dynamically generated for this specific snapshot, only with the service type that occurs in it. Its included IDs <u>must</u> not be considered valid of other snapshots.
		name	The name that describe the service type.
		type-id	The ID of the service type. The service nodes refer to this value to define their service type.

4.8.3 JSON Format

The produced **JSON** is produced as a single line minified to save space.

The contents are formatted in accordance to the **JSON** standard. The structure is similar to the one documented for the **XML** format, but with slightly different field names and some other differences:

- The main object is called `snapshot`;
- The **Service Type** is already the value pulled from the metadata;
- There is no metadata structure;
- The field names and structure is summarized in a prettified and anonymous sample in the [Listing 1](#), below.

```
{
  "snapshot": {
    "SampleKey": "...",
    "ServerName": "...",
    "SampleBeginTime": "...",
    "SampleEndTime": "...",
    "MaxThreadCount": ...,
    "RootInvocations": [
      {
        "PackageName": "...",
        "ServiceName": "...",
        "ServiceType": "java",
        "ElapsedMillis": ...,
        "CPUNanos": ...,
        "CallCount": ...,
        "ExceptionCount": ...,
        "MinElapsedMillis": ...,
        "MaxElapsedMillis": ...,
        "MinCPUNanos": ...,
        "MaxCPUNanos": ...,
        "UserNames": [
          "...",
          ...
        ],
        "ChildInvocations": [
          {
            ...
          }
        ]
      },
      ...
    ],
    ...
  }
}
```


Listing 1 - Snapshot as JSON example


4.9 Load Snapshot from file

It is possible to load a previously exported snapshot back into the tool to view it in the dashboards. However, only snapshots exported as XML are accepted. This is validated in the file upload panel (see [Figure 23](#), below) and only valid files actually uploaded.



Figure 23 - Load snapshot file (*invalid*)

When the file is successfully uploaded (see [Figure 24](#), below), a corresponding message is shown together with the  icon which is also the visual clue indicating that the snapshot is from a loaded XML and not from the running services. This visual clue is shown in the dashboards and panels that show the loaded snapshot. Not all dashboards show/reflect the loaded snapshot, e.g., the [Browse Running Services](#).

The snapshots can be from [Integration Servers](#) other than the current one. For snapshots exported with older versions of the [Service Profiler](#) the service icons may appear incorrect or as an  icon. This is because metadata about the exported services is not included as part of the snapshot and the tool tries to collect it from the current host where it may not exist, or even worse, not be true.

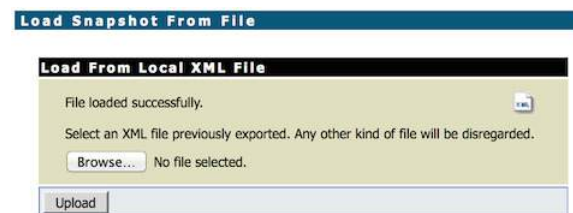



Figure 24 - Load snapshot file (valid)

As consequence of the file load, the snapshot is frozen (). If at the time of the file load the [Service Profiler](#) is started and collecting service information, it will continue doing so in the background.

To discard the loaded XML snapshot and access the running services snapshots, just go to the admin page and unfreeze the snapshot (see [Administration Page](#), on page 17).

5 EXTENSIBILITY

IMPORTANT: The information presented in this section may change in the future to accommodate the evolution of the tool. These changes will eventually be additions to the presented structures and extensibility mechanisms which, to the extent of the possible and reasonable, will be compatible with previous versions of the same mechanism. However, this compatibility compromise will be superseded when it impairs the progression of the tool evolution/betterment.

5.1 Overview

The **Service Profiler** core functionality is to gather raw information about the running **Services**. From that information, **Analysis Tools** may be implemented. The tool already includes some tools of that nature. However, to avoid limiting the analysis of the data to the tool's included functionality, external accessibility to the snapshot data is provided.

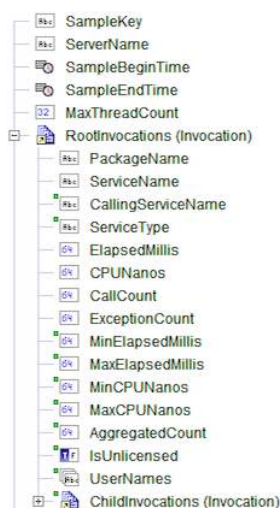


Figure 25 - The Snapshot as a Document structure

A **Snapshot** is a tree structure (see [Figure 25](#), above) with common information on the root node plus the entire top-level **Services**, each of them being a node and with (possible) child nodes in them representing the **Services** they have called. These child nodes can also have their own child nodes in them representing the **Services** they have called... and so on.

The **Snapshot** can currently be exported as an **XML**, **CSV** or **JSON** file (see [Export To File](#), on page 36).

Beyond the export as file feature, and closer to the **Integration Server** environment, the **Service Profiler** provides a public interface (API) of **Services** and **Document Types** that can be used by any external **IS Service** to request **Snapshots** and process them.

The term public determines that the interface exposes controlled functionality and that the retro-compatibility of that interface will be taken into consideration when upgrades are issued, but is not guaranteed. The latter may be justified by the integration of new and incompatible functionality, but whenever it may occur, it will be clearly described in the **Release Notes**.

5.2 Public API

The **Service Profiler** specific functionality is enclosed in the `WiaServiceProfiler` package.

The `WiaRoot` and `WiaUtilities` are also distributed as part of the installation, but these are support packages that are shared by other **Wrightia** products. The first contains no usable components but the latter contains some generic use services, which are not object of this documentation. However, the included services are fairly self-commented, through the use of Service and Field comment entries.

The `WiaServiceProfiler` package public interface is rooted on the `wia.pub.issprofiler` folder. To execute the enclosed services, the user must be part of the **WiaServiceProfiler's ACL**. These components are fairly self-commented, through the use of Service and Field comment entries.

The `wia.pub.issprofiler.ui` folder contains the functionality that serves exclusively the product **DSPs**. These are made public for the sole reason that they provide the exact same information that is viewed on the corresponding pages and are therefore not object of the current documentation.

5.2.1 Documents

The several existing views of a **Snapshot** are defined as **Documents**, which are used as input and/or output parameters of the **Services** on the public **API**.

On **Table 16** (below) are listed the public interface **Documents**.

Table 16 - Documents defined as public

wia.pub.issprofiler.docs:		
Interface	Document Name	Description
Take Snapshot	<code>ServiceCounters</code>	This document represents a complete, raw, Snapshot as provided by the profiler core. This document is a translation to <code>IData</code> from the native XML dictionary... not a direct conversion of tags and attributes. This document has become a Publishable Document on v1.2.3 ⁷ of the Service Profiler .
	<code>Invocation</code>	This is the representation of a single Service Invocation node of the <code>ServiceCounters</code> document.
View Per Service	<code>ViewPerService</code>	The snapshot represented as a View Per Service result.
	<code>InvocationAccumulator</code>	<code>ViewPerService</code> child document representing an accumulator for a particular Service .
Package Coverage	<code>CodeCoverage</code>	The snapshot represented as a Package Coverage result.
	<code>PackageCoverage</code>	Child document of the <code>CodeCoverage</code> , representing the coverage statistics for a particular Package .
Browse Snapshot	<code>BrowseSnapshot</code>	The snapshot represented as a Browse Snapshot result.
	<code>BrowseNodeAccumulator</code>	<code>BrowseSnapshot</code> child document, representing a Service node in the invocation path where its invocation statistics are kept.
Browse Running Services	<code>BrowseRunningServices</code>	The snapshot of the services still running. Each service tree runs in its own Service Thread and depending on the JVM version and request options it may also contain thread info.
	<code>ThreadInfo</code>	State information of a specific running Service Thread and its Java Stack Trace .
	<code>ThreadDump</code>	Dump the state of all running Threads .
Export To File	<code>ExportedFile</code>	The link representation of the result of an Export To File .

⁷ Even though this is the actual version when this feature became available, it was only officially released with the v1.3 of the tool.

For details on the structure of each of these documents, please use **Developer** (or any other capable tool) to view the **Document**'s field comments.

5.2.2 Services

This section describes the public **API Services**.

IMPORTANT: The public **API** *per se* does not include **Services** for administrative purposes. However, that functionality can be accessed through the **UI Services** for the administration pages.

Table 17 - Admin request Services

wia.pub.issprofiler.admin:	
Service Name	Comments
startProfiler	Start profiling. It is equivalent to the Start operation in the Service Profiler Admin page
stopProfiler	Stop profiling. It is equivalent to the Stop operation in the Service Profiler Admin page

Table 18 - Snapshot request Services

wia.pub.issprofiler.snapshot:	
Service Name	Comments
take	Take a snapshot of the current (possibly frozen) counters.
freeze	Takes a snapshot and freezes it in memory, caching for the next requests. Doesn't need to check if already frozen...
unfreeze	Unlock freeze settings, allowing each new request to get the most current snapshot. Doesn't need to check if already unfrozen: if not frozen, it does nothing.
publishCurrent	Take a snapshot of the current (possibly frozen) counters, and publishes it as a Publishable Document (wia.pub.issprofiler.docs:ServiceCounters).

Table 19 - Out-of-the-box Snapshot Analysis Services

wia.pub.issprofiler.analyze:	
Service Name	Comments
viewPerService	Analyzes the statistical Service Counter tree structure and produces a flat (array) of accumulators: one element per service. Optionally, the accumulator list can be filtered to only include those that are equal or above a given Minimum Elapsed Time value, and/or timings be generated as averages related to the Call Count .
packageCoverage	Analyzes the statistical Service Counter tree structure and produces a Service Coverage assessment for the snapshot. The analysis result is produced only for a given list of package names. Optionally, the resulting list may contain Packages that do not hold Services.
browseSnapshot	Analyzes the statistical Service Counter tree structure and produces accumulators per tree node. Optionally, the accumulator list can be filtered to only include those that are equal or above a given Minimum Elapsed Time value.
browseRunningServices	Analyzes the statistical Service Counter tree structure and produces accumulators per tree node but restricted to the top level services that did not yet return from its initial invocation. The analysis is similar to a finished statistical Service Counter tree structure, but rooted at the Service Thread in is running and with information on the currently running path. Depending on the version of the running JVM additional Thread State info and Java Stack Trace info may also be included.
viewPerUser	Analyzes the relation of users with top-level-services.

Table 20 - Export Snapshot to file Services

wia.pub.issprofiler.export:	
Service Name	Comments
to_csv	<p>Takes the current Snapshot and exports it to a Comma Separated Values (CSV) formatted file.</p> <p>The Snapshot is automatically taken by this service as part of the service workflow, and it is thus snapshot freeze setting, but is not affected by the exclusion filters.</p> <p>See CSV Format, in page 37, for a reference of the CSV data structure.</p> <p>Even though not available in the UI, this service also accepts an optional argument that gives indication to reset service counters when getting the current snapshot.</p>
as_csv_download	<p>Takes the current Snapshot, exports it to a Comma Separated Values (CSV) formatted file and downloads it as an attachment of the request. This service is not used by the tool's infrastructure and is intended to facilitate the remote access of automated scripts and/or browser based users. Its interface is designed to be invoked through an HTTP request, to which a text/csv MIME type response is given.</p> <p>The Snapshot is automatically taken by this service as part of the service workflow, and it is thus snapshot freeze setting, but is not affected by the exclusion filters.</p> <p>Optionally, an indication to reset snapshot counters is also possible.</p> <p>See CSV Format, in page 37, for a reference of the CSV data structure.</p>
to_xml	<p>Takes the current Snapshot to a XML formatted file.</p> <p>The XML dictionary is the one used internally by the tool to provide the current Snapshot.</p> <p>The Snapshot is automatically taken by this service as part of the service workflow, and it is thus snapshot freeze setting, but is not affected by the exclusion filters.</p> <p>See XML Format, in page 38, for a reference of the XML data structure.</p> <p>Even though not available in the UI, this service also accepts an optional argument that gives indication to reset service counters when getting the current snapshot.</p>
as_xml_download	<p>Takes the current Snapshot to a XML formatted file and downloads it as an attachment of the request. This service is not used by the tool's infrastructure and is intended to facilitate the remote access of automated scripts and/or browser based users. Its interface is designed to be invoked through an HTTP request, to which a text/xml MIME type response is given.</p> <p>The XML dictionary is the one used internally by the tool to provide the current Snapshot.</p> <p>The Snapshot is automatically taken by this service as part of the service workflow, and it is thus snapshot freeze setting, but is not affected by the exclusion filters.</p> <p>Optionally, an indication to reset snapshot counters is also possible.</p> <p>See XML Format, in page 38, for a reference of the XML data structure.</p>
to_json	<p>Takes the current Snapshot to a JSON formatted file.</p> <p>The Snapshot is automatically taken by this service as part of the service workflow, and it is thus snapshot freeze setting, but is not affected by the exclusion filters.</p> <p>See JSON Format, in page 40, for a reference of the JSON data structure.</p> <p>Even though not available in the UI, this service also accepts an optional argument that gives indication to reset service counters when getting the current snapshot.</p>
as_json_download	<p>Takes the current Snapshot to a JSON formatted file and downloads it as an attachment of the request. This service is not used by the tool's infrastructure and is intended to facilitate the remote access of automated scripts and/or browser based users. Its interface is designed to be invoked through an HTTP request, to which an application/json MIME type response is given.</p> <p>The Snapshot is automatically taken by this service as part of the service workflow, and it is thus snapshot freeze setting, but is not affected by the exclusion filters.</p> <p>Optionally, an indication to reset snapshot counters is also possible.</p> <p>See JSON Format, in page 40, for a reference of the JSON data structure.</p>

Table 21 - Utility Services

wia.pub.issprofiler.util:	
Service Name	Comments
getPackageNames	<p>Get the current list of package names, based on the complete list of Packages and the current Package Exclusion Patterns settings.</p>

For details on the input and output parameters for the listed Services, please use **Developer** to view their signature definitions and the comments filled for the fields. It's bound to stand true that those comments are more complete and up-to-date than any detached documentation.

5.3 Satellite Tools

Starting with version 1.3.4 of the **Service Profiler**, which also corresponds to **patch #4** for v1.3, the recognition of **Satellite Tools** has been added to the profiler.

Satellite Tools are tools that depend of a licensed instance of the **Service Profiler** up and running at the target **Integration Server**. The licensing of these tools fall under the umbrella of the **Service Profiler**, *i.e.*, if you have a licensed profiler you can use these tools free of charge.

Satellite Tools once installed are automatically recognized by the **Service Profiler** main menu and listed there for quick access (*see Figure 26, below*).



Figure 26 - Satellite Tools on the main menu

Satellite Tools are helper tools that, one way or another, are related or complement the work with the **Service Profiler**. These are goodies provided to customers that license the **Service Profiler**. Nevertheless, they can be installed and evaluated with an evaluation **License Key**.

One of available **Satellite Tool** is the **Package Dependencies Analyzer**. This tool analyzes the dependencies between packages:

- Declared and undeclared;
- Design-Time and Run-Time (with the help of an *impromptu* **Service Profiler** snapshot);
- Identifies references to undefined nodes, circular references, *etc.*

The **Package Dependencies Analyzer** is intended to answer the following questions:

- If I want to install this package, what other packages to I need to also install?
- What other packages are referencing this package?
- Which packages are not referenced by any other package (*aka*, top-level packages)?

The **Package Dependencies Analyzer** is currently only available as direct download links. Please contact us to get the link to the most recent version.

The **Service Profiler Demo** package **v1.1** also registers as **Satellite Tool**, but this just for convenience of access. There is no license limitation and it does not really add any useful functionality as a tool.

The **Service Comments Viewer** accesses the service and its signature defined comments and presents them as **HTML** in a page. In **APPENDIX C**, there is some more information about this tool.

6 TROUBLESHOOTING

Refer to this section prior to asking for support.

This section describes known solutions to known situations caused by common pitfalls.

A listed effect may be triggered by a non-listed cause and thus not having a description of a known sequence of actions to overcome it. When this happens, please report it to support.

The Licensing menu option does not appear

This is not the case where the menu option exists but is disabled... in this case the menu option is not listed at all.

On some installations, this may happen on the first time the **Service Profiler** pages are accessed: refreshing the page usually makes the link appear.

However, only users with **Administrators ACL** can see this link: make sure the user you are using obeys to this requirement.

(Access Denied) Cannot login onto the Service Profiler pages

Access Denied.

Services necessary to show this page are currently unavailable on this port. This is most likely due to port security restrictions.

If this is the only port available to access the B2B Server, contact webMethods Support.

The reason for this kind of problem is manifold. It can be a problem with the browser itself not being able to let go of the session status. Close all browser windows, reload the **WiaServiceProfiler** package and try again.

Occasionally, it may happen after the installation of an upgrade of the tool. Due to the incomplete or mixed settings of the **ACLs** caused by things being removed while others are added, the loaded settings do not match the runtime environment. Delete the **WiaServiceProfiler ACL** and reload the **WiaServiceProfiler** package. The security settings are reset to the default (*refer to **Security and Controlled Access**, on page 16, for details about which are these default settings*).

Functionality menu options appear disabled

Basically, the menu options are disabled if the core libraries are not loaded.

This can happen in the following known situations:

- The installation is not complete;
When the **Service Profiler** package is installed just via the **IS Admin** pages, the menu options are found disabled because the installation is not complete (*see **Installation and Setup**, on page 12 for further details*).
- A file named **ISSPROF_VOID** exists in the `<wm_is>/IntegrationServer` folder;
Delete the file.

It's not automatically created. It's a manual mechanism to prevent the **Service Profiler** from loading without the need to uninstall (see *Intentionally preventing the Profiler from loading*, in page 13, for more details).

- **LIBRARY** paths and **CLASSPATH**s are not correctly mounted or do not include the **Service Profiler** directories;

The directories have been removed or the start-up shell script that is required to be edited as part of the installation procedure has been replaced or edited.

Check if there was any **webMethods** upgrade or (re)installation performed recently. These are known to sometimes replace the server's launch script.

- The **Operating System** platform is not supported;

The **Service Profiler** libraries depend on native shared libraries which are available only for a limited list of operating systems & **CPU** architectures. If the expected shared library is not found the libraries will not load correctly and the menus are kept disabled.

Depending on the **Service Profiler** version, native code loading errors may not appear on logs and the list of supported platforms may differ.

(See *Environment Requirements & Compatibility*, on page 9, for further details)

- File permissions;

This may happen in **UNIX** environments. However, it will rarely occur because **Service Profiler** shell scripts set the needed execution permissions.

Nevertheless, depending on how the files have been copied, who is the owner and what user is being used to start the **Integration Server**... some glitch may happen and the files do not get the needed execute permissions.

- Errors during launch.

Check the console, server logs and the

`<wm_is>/IntegrationServer/serviceprofiler/logs/issprof.log` file for errors during the launch.

To specifically know if an error occurred while loading the native libraries, you can use the **Developer** tool and run⁸ the service `wia.issprofiler.admin:getStatus`. If an exception was raised, a variable named `stackTrace` will be placed on the pipeline containing the stack trace for it. Please pick its contents and report to support.

Timeout or long-running script alert on browser

With very large snapshots (1000, 2000 or more service nodes), the browser may stop the page loading with an alert/warning that the running **JavaScript** is taking too long. The message and the conditions for raising this warning vary from browser-to-browser and from environment-to-environment.

On the environment side of the issue, and again depending on the browser, little available **CPU** and **RAM** may increase the chance of raising the alarm.

The alert message is a security protection that works differently depending on the browser: for instance, while **IE** evaluates the number of executed script statements; **Firefox** evaluates the number of elapsed seconds. If the number of service nodes in the snapshot is border-line with the limits the browser evaluates, tweaking its setting may successfully eliminate the alert. But if the number of

⁸ A service can also be run directly from the **Integration Server Administration Pages**, from the Package Management menu option by following the link on the package name, browsing the package services and select a service. There, you will find an option to test/run the desired service.

service nodes is too high (above 3000) it will have to be a job for the **Service Profiler** tool itself to overcome the limitation (*please read further*).

Assuming that these are the most used browsers, some tests with around 3000 service nodes have been made with them, and so providing some performance and tweaking info in **Table 22**, below.

Table 22 - Script timeout browser related info

Browser	Result
Internet Explorer 6	<p>The slowest in the test, both on page loading and script execution.</p> <p>With 3000 nodes, the problem happens on every page load. Open All and Close All are very slow but do not raise the alarm. IE has a way of increasing the threshold of when the alarm is raised (http://support.microsoft.com/kb/175500). Only with a setting of 50,000,000 was possible to eliminate the alert. Browser restart is needed.</p> <p>No tests have been done with IE7.</p>
Firefox 2.0	<p>Highest size in memory.</p> <p>With 3000 nodes, the problem happens on every page load and while opening all nodes (but only on the first time). Close All is faster than Open All, but the latter is only slow on the first time it is called.</p> <p>Firefox has a setting to change the script timeout, in seconds: open the page <code>about:config</code> and change the <code>dom.max_script_run_time</code> value. The alert was suppressed by setting its value to 20. No browser restart is needed.</p>
Opera 9	<p>The fastest in the test, both on page loading and script execution.</p> <p>The smallest size in memory.</p> <p>With 3000 nodes, no problem ever arises.</p> <p>With 4000 nodes, no problem ever arises, apart from taking a little longer to load. However, in spite of the increased load, the Open All and Close All operations are quite fast.</p> <p>Opera also has a configuration setting page (<code>opera:config</code>), but no setting related to a script timeout was identified.</p>

However, if the number of service nodes on the snapshot is above the defined limit, the **Browse Snapshot** and **Browse Running Services** dashboards automatically set a paging control for the tree of nodes. There is an assumed default value, but it can be set to different value by entering or editing the `issprof.browsesnapshot.nodesperpage` property. For more details see **APPENDIX B**.

Example:

```
...
issprof.browsesnapshot.nodesperpage = 2000
...
```

Profiler not correctly initialized: E01

This error will only happen if the **Java** instances of the tool classes are remove from memory in runtime... for whatever reason... and should never happen.

To correct the situation you can either reload the tool package of just run the `wia.issprofiler.admin:startup` service from the **Developer** tool or using a browser to do an **HTTP** service invoke.

7 SUPPORT

7.1 Disclaimer

Product support is exclusively provided by Wrightia.

webMethods Support Services must not be contacted with issues regarding Service Profiler or somehow related with the tool. Furthermore, when reporting a webMethods Integration Server issue with hard evidence (*e.g.*; when providing a JVM thread dump), it may be required to completely remove the Service Profiler from the equation for full webMethods Support Policy compliance. For this purpose, the tool may be prevented from loading without needing to uninstall it (*see Intentionally preventing the Profiler from loading, on page 13*).

7.2 Reporting a Service Profiler issue

When reporting Service Profiler issues please use the product.support@wrightia.com e-mail address and provide information that identifies:

- You as a Wrightia customer;
- Your Service Profiler version and patch level;
This can be obtained by clicking the [WiaServiceProfiler](#) link on the [Packages > Management](#) IS administration page, and print it.
- Your Integration Server version and patch level;
This can be obtained by printing the [Integration Server About Page](#).
- Your Operating System name, version and CPU architecture;
This can be obtained by printing the [Integration Server About Page](#).
- Additional e-mail and phone contacts that can be reached to clarify the issue.

And identification of the problem/issue/situation itself:

- A short description of the problem;
- An extended description of the problem and, if possible, a way of having it reproduced;
- Environment;
Define what kind of setting is the target platform: [Development](#), [Test](#), [System Test](#), [Staging](#), [Production](#), etc.
- Issue classification.
It is a classification of the issue in terms of whether it is an [error/bug](#), an [enhancement request](#) or just a [question/doubt](#).

Issues have to be reported in [English](#) language.

8 FURTHER READING

You may find reading the [Profiling Whitepaper](#) useful. This document is provided separately and the latest version can be downloaded from [Wrightia](http://www.wrightia.com) website (<http://www.wrightia.com>). Rather than providing additional information about the tool, the whitepaper focuses on profiling in general, the usefulness of a [Profiler](#) and the reasoning for using a tool such as the [Service Profiler](#).

APPENDIX A GLOSSARY

Item	Definition
Aggregated Count	<p>Number of services that being aggregated at the referenced node.</p> <p>It means that the referenced node counts for all found services that fall out of the <i>Licensed Service Volume</i> (see <i>Licensing Pages</i>, on page 12).</p> <p>This value only appears when the <i>Licensed Service Volume</i> is exceeded.</p>
Analysis Tool	A dashboard view of the <i>Snapshot</i> data organized in a way that reveals relations on the collected data, either interactively or in the form of a report.
False Root	<p>A <i>False Root Service</i> is one that is presented at the top of the call tree but because that's when the <i>Service Profiler</i> has first collected it, but in fact, it is being called by another Service... not collected by the <i>Service Profiler</i>.</p> <p>See also <i>Top Level Service</i>.</p>
Faux Root	See <i>False Root</i> .
Own Code	In opposition to <i>Whit Child Code</i> , this set of timings relates <u>solely</u> to the code that, in itself, is the body of the subject Service. This excludes times measured while in any Services the current one calls as part of its designated functionality.
Snapshot	A <i>Snapshot</i> is an instant sample of the data structures internal to the <i>Service Profiler</i> .
Time Elapsed	This is the absolute time that has elapsed as measured by an external chronograph, or even on your wrist watch.
Time Spent	<p>In opposition to <i>Time Elapsed</i>, this value measures only the time the Service was in the CPU doing real work.</p> <p>The CPU is being used by more than one thread. The scheduler slices the availability of the CPU by giving each thread an opportunity to run. This value counts the time the Service spend effectively using the CPU.</p> <p>A Service may have a Time Elapsed much larger that the Time Spent if it is given little opportunity to run. This can be caused by:</p> <ul style="list-style-type: none"> • A thread with much higher priority hogging the CPU availability; • A badly dimensioned system with not enough threads allocated, resulting in an activity of context switching; • Not enough resources (RAM, network bandwidth, etc.) causing the Service to spend most of the time waiting; • Etc.
Top Level Service	<p>A Service that is not called by another service, thus being at the top of the call tree.</p> <p>This kind of service may also appear referenced as <i>Root Service</i>.</p>
Root Service	See <i>Top Level Service</i> .
With Child Code	This set of timings corresponds to the current <i>Service Own Code</i> <u>plus</u> any times measured while in any Services the current one calls as part of its designated functionality.

APPENDIX B PROPERTIES

This appendix lists all existing properties, their purpose and default values.

These properties are found in the configuration file `issprof.cnf`, in the `config` folder. Since **v1.4** of the tool, these files are created and maintained out of the package internal structure in the folder `<IS_DIR>/packages.var/WiaServiceProfiler`.

To take effect, any of the listed properties requires either a reload of the `WiaServiceProfiler` package or a manual execution of the service `wia.issprofiler.properties:load`, with input parameter `forced` set to `true`.

Table 23 - List of all possible and editable properties in file `issprof.cnf`

Property	Meaning
<code>issprof.browsesnapshot.nodesperpage</code>	<p>Default value is 1000.</p> <p>This setting defines the number of node per page presented for viewing the snapshot as a service call tree and affects the presentation the Browse Snapshot and Browse Running Services dashboards.</p> <p>A limitation is emphasized, however:</p> <ul style="list-style-type: none"> If the Snapshot tree in the dashboard is paginated, the scope of the find for a node in the tree is limited to the current page. On the special case of the navigation link from the View Per Service to the Browse Snapshot, the navigation & find is always (and only) made onto the first page. However, jumping to the next/previous page and repeat the find is always possible, but hits on the entire snapshot are not seen all at once. <p>There is no value that means 'do not paginate'. Therefore, make your choice of value carefully.</p>
<code>issprof.startup.autostart.enabled</code>	<p>This property is managed by settings in the Administration Page. See Administration Page, in page 9, for details.</p>
<code>issprof.shutdown.publish-snapshot.document.enabled</code>	<p>This property is managed by settings in the Administration Page. See Administration Page, in page 9, for details.</p>
<code>issprof.override.server-name</code>	<p>This property is managed by settings in the Administration Page. See Administration Page, in page 9, for details.</p>
<code>issprof.startup.autostart.activation-name</code>	<p>This property is managed by settings in the Administration Page. See Administration Page, in page 9, for details.</p>
<code>issprof.license.info.autorefresh.seconds</code>	<p>Default value is 3600.</p> <p>This setting defines the number of seconds that have to pass before top frame auto refreshes.</p> <p>Setting a value of 0 (zero) disabled the auto refreshing of that frame.</p> <p>Available since v1.5.</p>
<code>issprof.alert.threshold.percentage.red</code>	<p>Default value is 100.</p> <p>This setting defines a bottom threshold for error percentage.</p> <p>The value is the percentage of errors (<i>ratio of call count versus exception count</i>) from which the value is presented with red alert.</p>
<code>issprof.alert.threshold.percentage.amber</code>	<p>Default value is 90.</p> <p>This setting defines a bottom threshold for error percentage.</p> <p>The value is the percentage of errors (<i>ratio of call count versus exception count</i>) from which the value is presented with amber alert.</p>



Property	Meaning
<code>issprof.alert.threshold.service.exclude.patterns</code>	<p>Default value is <code>1:"^.*:[tT]hrow.*Exception.*\$";2:"^.*:[tT]hrow.*Error.*\$"</code>.</p> <p>This setting defines a list of service names for which it makes no sense to calculate the error threshold because it would naturally always be 100%</p> <p>The value is the representation of a list of Regular Expressions that are used to filter out the service names for which error percentage threshold is not calculated or shown. Each element in the list is separated by a semi-column ("<code>;</code>") character and each element is a key/value pair, where the key is a (non-repeated) number and the value is a double-quoted string. The key/pair separator is a colon ("<code>:</code>") character.</p>

APPENDIX C SERVICE COMMENTS VIEWER

Below is presented a partial screenshot of a sample output of this tool, in a browser, for the service `wia.issprofiler.data.snapshot:getCurrent`.

Service Selection > View Comments

- Go Home
- Select another service

Identification Information

Service Package:	WiaServiceProfiler
Service Name:	wia.issprofiler.data.snapshot:getCurrent
Service Version:	1.4.5
Available since version:	1.0
Service Type:	FLOW
Service Author(s):	Antonio Abreu
Service Category(ies):	
Original Project:	
Security Classification:	

Description

Get the current snapshot directly from the source XML format.

Input Arguments

Name	Data type	M/O/C(*)	Comments
reset	Boolean	O	Default is false. If true resets counters after getting the current snapshot
withEnrichment	Boolean	O	Default is false. If true, adds enrichment metadata info to the returned snapshot structure.

(*) M - Mandatory, O - Optional, C - Conditional

Output Arguments

Name	Data type	M/O/C(*)	Comments
frozen	Boolean	M	If true, this means that the profiler is set to <i>frozen</i> and the returned snapshot is a cached value.
snapshot	Document	M	Direct document representation of the taken XML
			When a root invocation has a calling service, it is not a real root invocation and becomes known as a 'false root'
@service-type-id	String	O	The ID that identifies what type of service this node represents. Only set when enrichment is set to true. This ID is dynamic and only valid in the context of the current snapshot. Each snapshot generates their own IDs, always starting at 0 (zero). This ID can be translated into a meaning and valid value across all snapshot in the metadata sub-structure of the current snapshot.
@elapsed-ms	String	M	Service accumulated elapsed time, in milliseconds.
@cpu-ns	String	M	Service CPU spent time, in nanoseconds.
@exception-count	String	M	Service accumulated number of exceptions. This is the count of actual thrown exceptions. Not to be confused with successful executions returning some kind of error code.
@min-elapsed-ms	String	O	The lowest achieved elapsed time value for an invocation of this service, in milliseconds.
@max-elapsed-ms	String	O	The highest achieved elapsed time value for an invocation of this service, in milliseconds.
@min-cpu-ns	String	O	The lowest achieved CPU spent time value for an invocation of this service, in nanoseconds.
@max-cpu-ns	String	O	The highest achieved CPU spent time value for an invocation of this service, in nanoseconds.
@unlicensed	String	O	true if this service node represents the accumulation of all child nodes that, at this level and count, already exceed the service profiler license settings.
@aggregated-count	String	O	true if this node values are an aggregation of a set of child nodes that otherwise would be presented in detail.
user-names	String[]	O	List of users that called this service. This list is only filled for root invocations.
child-invocations	Document	O	Services called by this service.
invocation	Document[]	M	(recursive...)
metadata	Document	O	Definitions about this snapshot.
service-type	Document[]	M	Cross-reference for the IS of the service type in the current snapshot.
@type-id	String	M	An automatically generated unique ID. Only valid in the context of the current snapshot.
@name	String	M	A meaningful name for the type.

(*) M - Mandatory, O - Optional, C - Conditional

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