Wily Introscope a CA Product-Utility that Comes with Solution Manager Specifically for Java Monitoring

Applies to:
This article is applicable to CA Wily Introscope that comes with the Solution Manager 7.0. For more information, visit the Java homepage.

Summary
Wily Introscope comes in the bundle form with Solution Manager 7.0, This is a CA (Computer Associates) product specially designed to monitor the performance issues of Java Stacks/Java Systems. I have included the overview of the Wily and its usage and also given some examples of dashboards that comes with the Wily for ready to use. This paper does not cover all the capabilities and features of Wily as there are so many to be included in a small paper, but have tried to give a starting point if someone wants to know what Wily is and how they can start working with wily. It also describes few very common metrics used for monitoring and their benefits as well.

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Author Bio
My Name is Sumit Kothiyal and I have been working as a SAP NetWeaver Administrator for the last 5 years. I have worked on Wily and Solution Manager and have been involved in implementation, configuration and setup of the same. I am based out of India but have worked for major clients all around the world. My area of expertise includes XI, NWDL, WebDynpro, Upgrade and Unicode Conversion (TU&UC and CU&UC), Solution Manager, CA Wily Introscope and SAP BI.
Table of Contents

Solution Manager With Wily Introscope ................................................................. 3
Common Issues that are Resolved with Wily Introscope ........................................ 3
SAP Solutions Monitored by Introscope .................................................................. 3
This is what Introscope Monitors ........................................................................... 5
How to Start Wily Introscope .................................................................................. 5
Some Important Metrics ......................................................................................... 7
Definition of Important Application Components .................................................. 8
Definition of important Resource States .............................................................. 10
Investigator Tree and Domains .............................................................................. 11
Investigator Search Tab and useful Search Expressions ......................................... 12
Few more Important Metrics ............................................................................... 13
Using DashBoards in Introscope ............................................................................ 15
Examples of DashBoards in Wily Introscope ......................................................... 16
Generating Introscope Reports ............................................................................... 18
Related Content ..................................................................................................... 21
Disclaimer and Liability Notice ............................................................................... 22
Solution Manager With Wily Introscope

Solution Manager 4.0 includes a “read only” licensed version of Introscope for SAP NetWeaver with:

- Core Introscope Tools: Investigator, Dashboards, Transaction Tracer, Error Detector, Leak Hunter, SQL Agent and Web Services Manager
- Number of dashboards created by SAP
- Key NetWeaver components and subsystems created by SAP

However, there are some restrictions:
- Customers cannot create their own dashboards
- Customers cannot integrate alerts with external frameworks
- Customers cannot monitor non-SAP applications & systems

The restrictions can be overcome by getting the license from Wily Technology CA.

Common Issues that are Resolved with Wily Introscope

One Particular Database Query Takes longest time to execute, analyzing if it’s a Table Index issue or something else.

- Slow iView: where is the problem with the iView.
- Authentication Keeps Getting Slower: Issue with the SiteMinder, memory leakage or the CPU utilization.
- Slow Web DynPro Applications: If it’s a problem in the ABAP or the Java stack or frontend/backend issue.
- An XI Queue gets Stuck: Where is the error occurred that stopped the messages from processing further.

Wily can help you

- Identify potential leakage in production applications.
- Isolate and remove leakage that occurs during stress testing.
- Clearly pinpoints the sources of leaks in application components and methods.
- Monitor the Java objects in memory, the time they stay in the memory.

Note: Wily is really very helpful for Java Stack issues, its major utility lies with the Java Stack monitoring.

SAP Solutions Monitored by Introscope

As already mentioned earlier the below SAP Solutions specifies the same.

- Enterprise Portal
- BI 7.0
- SAP XI and PI
- CRM
- SRM
- IPC
- xMII
- Duet

And all the Other Application Running on NetWeaver Java Stack.

Let's looks into the benefit of Wily for the ABAP stack:
It helps in Consolidation of ABAP metrics for multiple ABAP servers into a single view that helps in viewing multiple ABAP instances at same time

Persistence of all the ABAP metrics collected by Introscope for historical analysis.

Helps you in Correlating the ABAP and Java performance metrics and differentiate between them and thus doing the root cause analysis

Helps you create customized Dashboards for quick diagnosis and proactive monitoring

Helps in automatic discovery and change detection of SAP ABAP components.

Below are the few ABAP metrics:

- CCMS Alerts
- Component Data
- Operating System
- File systems.
- Short Dumps
- System Information
- Updates
- User Information
- Work Processes
- Workload Summary

Like as shown in the figure
This is what Introscope Monitors

Standard Java and J2EE Components
Servlets, JSPs, EJBs, JMS
Heap, CPU, Threads, HTTP Sessions, Socket I/O, File I/O, Connection Pools
EP
Portal Request Manager and Dispatcher
PageBuilder and PageProcessor
iViews
Portal Content Directory
Knowledge Management
TREX
User Management
XI
Adapters: JDBC, File, RFC, BC, XI, SOAP, JMS, Mail,
Messaging and Queues
Mappings
Back-end Connectivity:
JCO: Calls to ABAP functions
JDBC: SQL Calls to Databases
Web Services: Consumers and Producers
Web DynPro Applications
Applications, Actions, Components, Controllers, Events, Views, Windows
And a lot more.

How to Start Wily Introscope

Install the Introscope and then start the application.
Use the host name or the IP address.

Click on connect:

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Put the user name and the password.

Console Window Now Visible

Click on Workstation → New Investigator
Below is the Introscope Metrics for a SAP Enterprise Portal.

Some Important Metrics

- **Metrics**: Are a measurement of a specific application activity or resource state.
- **Value**: A quantity as defined by the metric name.
- **Min**: The lowest value during the time interval.
- **Max**: The highest value during the time interval.
- **Count**: The number of measurements factored into a metric calculation.
- **Note**: By default, the metric data is reported to the workstation every 15 seconds.
Metrics come from two different sources.
Probes inserted into byte code.
Application server reporting systems such as JMX (web logic, jBoss etc) and PMI (web sphere).

Metric types

Application Components:
Throughput
Response Time
Load
Stalls
Errors
Instance Counts

Resource States:
Memory
CPU
Thread Pools
JDBC Connection Pools
Network I/O

**Definition of Important Application Components**

Throughput: The number of requests completed during a period of time

Metric Name: Responses Per Interval

Response Time: The average amount of time (in milliseconds) it takes to complete a request during a time period.

Metric Name: Average response Time (ms).
Load: The number of requests at the end of the time interval that have not yet completed.
Metric name: Concurrent Invocations.

Stalls: The invocations that have not yet completed within a specified threshold (Default: 30 seconds)
Metric name: Stall count.

Errors: The number of exceptions thrown (uncaught) or HTTP error pages returned during a time period
Metric name: errors per interval
Instance Counts: The number of object instances of a particular class on the heap (not enabled by default) it tracks the number of object instances for a particular class on the heap at a moment in time. The objects may be referenced or awaiting garbage collection.

Metric name: Approximate instance count

**Definition of important Resource States**

Memory: The number of total bytes and bytes in use on the JVM heap space

GC heap: Bytes in Use and Bytes Total

The bytes in use are the amount of memory on the garbage collection heap that is currently used by objects. The bytes total represents the amount of memory allocated by the JVM.

CPU: The average percentage of the processor(s) being utilized during the time period

Utilization % (Process)

Utilization % (aggregate)
CPU Utilization is measured by the platform monitor (that runs on Windows, AIX, Solaris, and Red Hat Linux) that comes with the base Introscope product.

The CPU Metrics come in two forms:

The aggregate utilization is reported on a per processor basis and represents the total utilization of that processor.

The process utilization is reported against the total computing power of the host, but is limited to the percentage by the JVM process that Introscope is monitoring.

Thread Pools: The number of threads in the thread pool in use. JMX or PMI – produced

Metric names vary per application server.

The number of threads in the application server thread pool that are currently in use handling requests can be gathered from JMX on WebLogic or PMI on WebSphere.

Connection Pools: The number of connections in the connection pool in use.

JMX or PMI – produced

Metric name vary per application server

That state of connection pools can be measured. Metrics produced via JMX or PMI report on the number of connections currently in use in a JDBC connection pool.

Network I/O: Bytes sent and received via network sockets per second during a period of time

Input bandwidth (Bytes per Second)

Output bandwidth (bytes per second)

**Investigator Tree and Domains**

The investigator Tree: Provides a tree view of domains and metrics in a hierarchy.
Domains: How Introscope partitions agents and monitoring logic. Agents are mapped to domains. Metrics are viewed in a hierarchy under the domains in which they are contained.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Hosts</th>
<th>Processes</th>
<th>Agents</th>
<th>Resources</th>
<th>Metric Name</th>
</tr>
</thead>
</table>

Investigator Search Tab and useful Search Expressions

Apart from what we have learned so far you can also monitor few more metrics as below and using the Investigator's search Tab:

The Search Tab lets you search for metrics containing particular strings or matching regular expressions. This can be a very powerful tool for quickly finding issues associated with particular subsystems or components. You can also search specific nodes of metrics tree.

Useful Search Expressions

Search for Response Times:

`.*/(ms)`

Search for Invocation Rates:

`.*/(Responses|Invocations) Per Interval`

Search for High Concurrency:

`.*/Concurrent Invocations`

Search for Errors:
"Errors."
Search for Stalls
"Stall."

**Few more Important Metrics**

**Backend Metrics**

Introscope provides Backend metrics for JDBC, JCO, Web Service, and other Socket calls.

How to use: By selecting the Backends node and the Overview tab, you can see a table with statistics for all Backends.

**CPU**

It gives you detail of the CPU of the node and the Utilization factor which is an important KPI for performance.

It also shows utilization at the processor level as shown below which is also a very important analysis factor.
Frontend Metrics

Introscope provides Frontend metrics representing various web applications and URLs included in them.

How to use: By selecting the Frontends node and the Overview tab, you can see a table with statistics for all Frontends on the current JVM.
Using DashBoards in Introscope

Also for the monitoring purpose we can use the dashboards that are there in the Introscope by default.

Dashboards are viewed in the Workstation’s Console window as shown below.

To view dashboards, use the Workstation\New Console menu item.

Click on workstation and select new console

The next screen will be:
At the top you can select few dashboards from the drop down menu.

**Examples of DashBoards in Wily Introscope**

Following are few examples of the dashboards and the type of LIVE response you can see.

EM Self Monitoring
In the same manner you can select few more dashboards and see the live monitoring by the Introscope and see the response of the Java Instance.

**Generating Introscope Reports**

Wily Introscope has Reporting functionality

Reports will get generated in multiple formats:
- PDF, HTML, XML, Rich Text Format, Excel, CSV, Text, Jasper

Wily Introscope provides four types of Reporting Templates:
- J2EE Overview
- OS Overview
- Top iViews and Components
- Top JDBC Statements

Also the Reports can be generated for Periods

Launching the Report Generator
Selecting a Report Template

Specifying Time Period & Agents and Previewing

Specifying Format and Saving Report
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Related Content

https://service.sap.com/diagnostics

For more information, visit the Java homepage.
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