SysMaster
WAS User Guide

SysMaster v5.0

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About This Document

Intended Audience

SysMaster®(hereafter SysMaster) is an APM(Application Performance Management) solution developed by TmaxSoft, for integrated performance management of distributed applications. Its architecture enables an integrated real-time monitoring of various resources, including web server, WAS, TP Monitor, application server, etc., through an intuitive Web UI. It also supports efficient resource management and error management. It efficiently manages performance of the overall system resources, quickly detects and handles errors, and systematically manages system performance through various statistical reports.

This guide is intended for users and administrators who want to use SysMaster's monitoring and statistical reporting functions.

Required Knowledge

This guide contains information about using SysMaster to monitor WAS products. Users need to have an understanding of the following:

- Basic knowledge of UNIX OS (including LINUX)
- Basic knowledge of various resources supported by SysMaster

  E.g., TP Monitor, WAS (Web Application Server), web server, application server, etc.
- Basic knowledge of databases

Document Scope

This guide does not contain all information needed for the actual application or operation of SysMaster in the production environment. For more detailed information about the environment configuration, operation, and management of SysMaster, refer to the relevant guides.

Document Organization

This guide consists of five chapters and four appendices.

Descriptions for each are as follows:

- Chapter 1: Introduction

  Introduces SysMaster's WAS Provider.

- Chapter 2: Dashboard

  Describes the contents and configuration of real-time dashboard for WAS.

- Chapter 3: Real-Time Analysis

  Describes the contents and configuration of Real-Time Analysis screen.

- Chapter 4: Analysis

  Describes the contents and configuration of Analysis screen for WAS.

- Chapter 5: Statistics/Reports

  Describes the contents and configuration of statistical data and reports for WAS.

- Appendix A: Data Collection

  Describes the data collection technology.

- Appendix B: SysMaster DC Configuration

  Describes how to configure SysMaster DC.

- Appendix C: Thread Dump Configuration

  Describes how to configure JEUS settings for thread dumps.

- Appendix D: Event Adaptor Configuration

  Describes how to configure SysMaster Event Adaptor to write user code for seding SMS and e-mails, etc.

Conventions

Convention	Meaning
<AaBbCc123>	Filename of a program source code
<Ctrl>+C	Hold the control key and press C
[Button]	Button or Menu name
Bold	Emphasis
" "(double quotes)	Reference to chapters or sections in the manual, or to other related documentation
"Input Item"	Description for an input item on the screen
`Hyperlink`	Mail account, website, link to other chapters or sections
>	Progress order of menus
+----	Files or directories exist below
|----	Files or directories do not exist below
Note	Reference or note
[Figure 1.1]	Figure name
[Table 1.1]	Table name

System Requirements

Category	Requirement
Platform	IBM AIX 5L 32/64bit, IBM AIX 6L 32/64bit
	HP-UX 11 32 /64bit, HP-UX 11 32/64bit ia64
	Solaris 7 - 10 32/64bit, Solaris 32(x86)bit
	Linux Kernel 2.x/2.x ia64
	Windows Win32
Master	JDK 1.6
	Memory, more than 1024MB recommended (min 512MB)
	1GB available hard disk space (min)
Agent	JDK 1.5 ~ 1.6
	Memory, more than 512MB recommended (min 256MB))
	512MB available hard disk space (min)
Web UI Admin	JRE 1.6
	Memory, more than 512MB recommended (min 256MB))
	512MB available hard disk space (min)
	Supported browsers, IE10 or later, Chrome
Supported Database	H2DB(Basic)
	Oracle 10g, 11g, 12c
	Tibero 4, Tibero 5

Note

SysMaster Master Server has built-in H2DB. In cases when there are high volumes of transactions or collected data, SysMaster must be changed to a version that uses a commonly used DBMS such as Tibero or Oracle.

Supported Resource Environment

- Supported Oracle Installation JDK Version: JAVA 1.4 ~ 1.6

- Supported Resource Environment

Resource	**Supported Version**
AnyLink	3.2.5 and later
JEUS	4.x and later
WebLogic	9.x ~ 10.x
WebSphere	5.x ~ 6.x
Oracle AS	9.x
Oracle	10g and later

Chapter 1. Introduction

This chapter describes the key features of SysMaster for WAS.

1.1. Overview

SysMaster for WAS queries statistics and error data for real-time WAS monitoring and data analysis.

WAS provider queries for WAS status related to services, invocations, resources, exceptions, VM, and host. It also prepares and queries for statistical data of active services and service data.

The following is an example of the **[WAS]** menu.

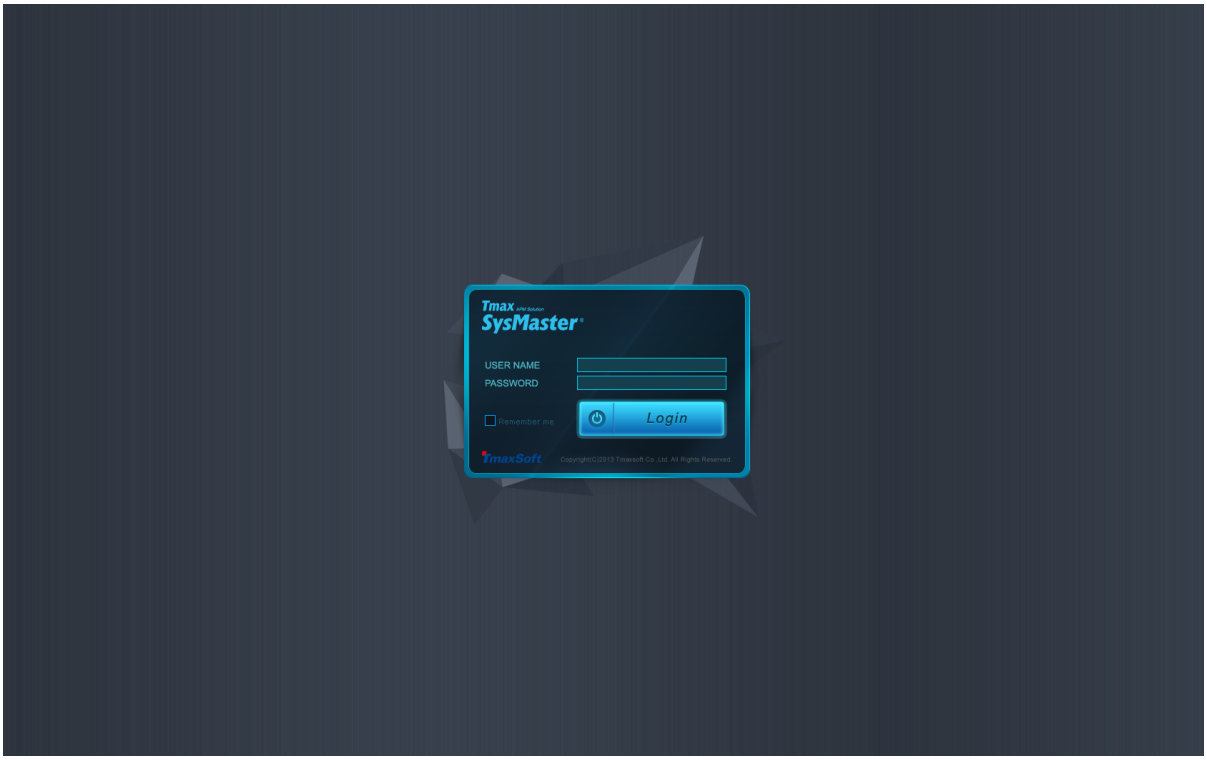
[Figure 1.1] SysMaster for WAS

> **Note**
>
> Although SysMaster for WAS supports products like JEUS, WebLogic, WebSphere, etc., this guide uses TmaxSoft JEUS in its examples.

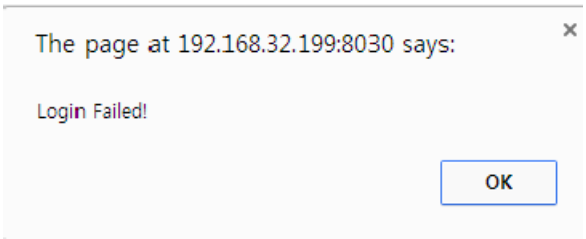
1.2. Login

The following is SysMaster's login screen.

[Figure 1.2] SysMaster for WAS



The user name and password can be saved by checking the **[Remember me]** checkbox. If an incorrect ID and/or password is entered, the following popup will appear.



1.3. Main Menu

SysMaster for WAS consists of four main menu items and their sub menus. Additionally, container shortcuts, event boxes, functions, and expand/collapse buttons are provided.

- **Dashboard**

  Provides real-time monitoring data for WAS and service-specific system data.

Menu Item	Description
[Summary]	Checks for the status of a business through its average response time (s), execution count, and service information.
[Active Service]	Monitors and checks the container status of a business through the container's active service bar.
[Real-Time Dashboard]	Checks the hourly status and information of the container in real-time using container-specific active data of the user-interested indicators, Java virtual machine (JVM) data, user data, and throughput data of user-interested indicators through charts and tables.
[User-defined Real-Time Dashboard]	Provides more variety of indicators and data than the **[Real-Time Dashboard]**. Checks the container's status and information in real-time through charts and tables of active data, host data, java virtual machine(JVM) data, user data, transaction view data, throughput, and event data.
[User-defined System Dashboard]	Checks the system indicators for each container instances. Checks the node's system status and information in real-time through six chart types (CPU usage, memory usage, swap memory usage, disk usage, disk I/O, and network I/O).
[Custom Dashboard]	The user creates a custom dashboard and checks for the desired indicators.

- **Real-Time Analysis**

  Provides detailed monitoring information about WAS. In general, when an error is detected from the dashboard, detailed error information can be obtained through real-time analysis of the error data.

Menu Item	Description
[Service(Active)]	Checks real-time data for services, SQL, exceptions, and external transactions.
[Snapshot]	Checks real-time data for threads, class loaders, collection objects, file socket sessions, and environment variables.
[Event]	Checks current day's event status and event list.

- **Analysis**

  Provides periodic analysis data using charts and tables that can be used to analyze the periodic status of each container.

Menu Item	Description
[Summary]	Displays periodic charts for JVM data, throughput, user data, service execution data, and error event charts.
[TX View]	Checks periodic distribution data for the current transaction.
[Service]	Checks periodic data for service, SQL, exceptions, and external transactions.
[Infra]	Checks periodic data for JVM, Java Pool, unclaimed resource, JNDI, and host.
[Event]	Displays periodic status, list, trend for event occurrences.
[Visitors]	Displays periodic user-related charts.

- **Statistics/Reports**

  Provides current trends and reports.

Menu Item	Description
[Top N Trends]	Provides daily and monthly service trends. Shows the top 5 services in the sort order.
[Relative Trends]	Provides relative daily and monthly service trends of search indicators.
[Report]	Displays summary information, and general and business reports.

- **Container Shortcut**

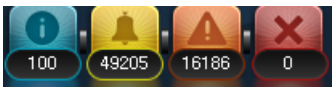
  A user-defined container can be assigned to a shortcut. The container shortcuts can be used to easily select and deselect frequently used containers. Up to 10 container shortcut buttons can be added.

  The shortcut icon shows the active/inactive status of the container.

  When the shortcut button is not selected, the star icon is black ( ). When a shortcut is selected, the icon is filled with a random color, and the container becomes selected in the [Working List] and is added to the [Working Container].

- **Event Box**

  Provides the current number of occurrences of each event type.



From the left, **INFO, WARNING, ERROR, FATAL** events are shown with the current day's cumulative total updated in real-time. The totals are reset every 24 hours. When an event icon is clicked, the screen will go to the **[Real-Time Analysis] > [Event]** screen.

- **Action Buttons**

  The buttons on the top right of the screen consists of Log Out (), Help (), and SysMaster Admin Settings () buttons.

- **Expand/Collapse Buttons**

  The main menu and container shortcut menu can be hidden using the  buttons to expand the area for charts or tables. Re-click the button to restore the menu.

1.4. Working List

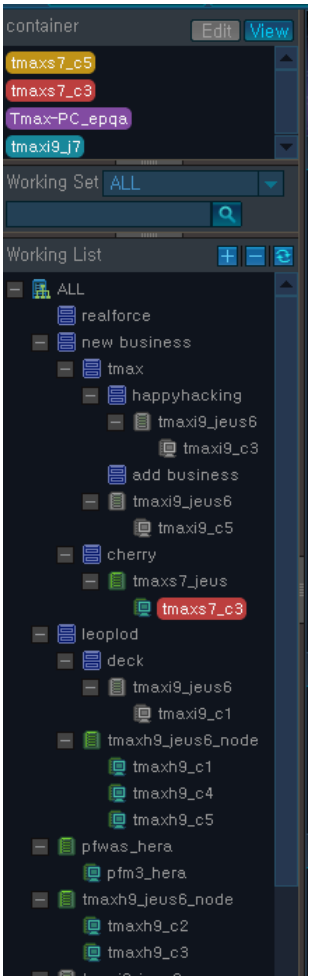
Working List is a list of nodes and containers. WAS component tree is the starting point of WAS service and system monitoring where the containers of nodes can be selected for monitoring. The nodes of the tree are made up of business systems configured with SysMaster, and all registered WAS nodes and J2EE containers.

When a level (a node of a container) is selected from the Working List, the container is also added to the Working Container and is used in the search with the existing containers. Working List can include one or more resources depending on the screen. Up to 10 multiple selections are allowed. Selected resources are shown in different colors and are added to the Working Container list on the top. All data charts and tables on all WAS screens are for the selected node(s) of the tree.

The Working List is used in the **Edit** or **View** mode. View is the default mode. A container can be selected or deselected in the View mode. In the Edit mode, container shortcuts and items in the Working Set can be added, modified, or deleted.

The following shows the **Working List** that is used to check the status of each container and node.

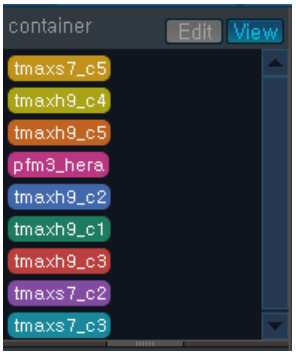
[Figure 1.3] Working List



- **Working Container**

  Shows the list of containers that are selected in the Working List. It can be used to easily check the containers selected for monitoring. A selected container can be deselected from either the Working List or Working Container.

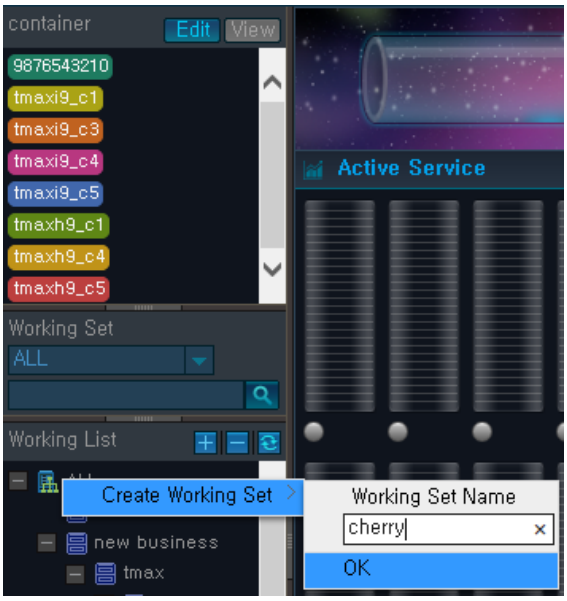
  If multiple containers are selected from the Working List, they are each displayed in different colors and are shown on the charts in the corresponding colors.



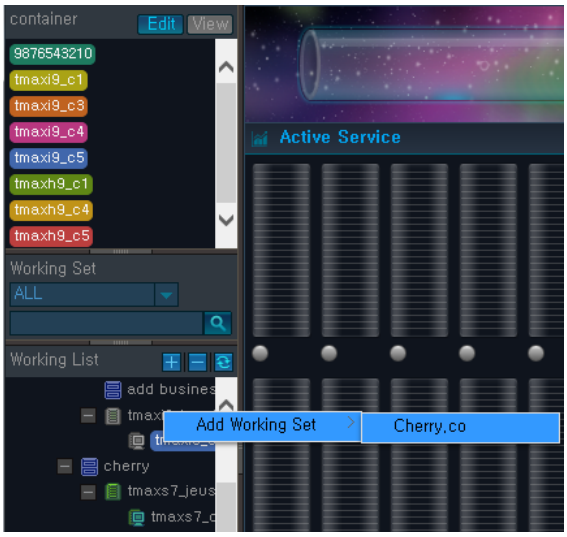
- **Working Set**

  The Working Set can be used to group registered businesses, nodes, and containers to perform a separate search when there are too many in the Working List. Working Set is set to ALL by default. Change to the Edit mode to add, edit, or delete to/from the set.

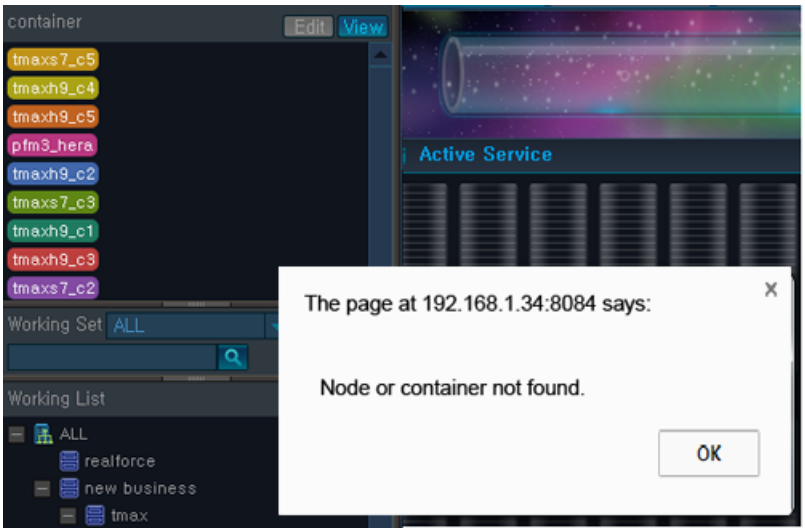
  To add a new Working Set, select 'ALL' from the dropdown list, and then select 'ALL' from the top of the Working List tree to see the [Create Working Set] menu item.



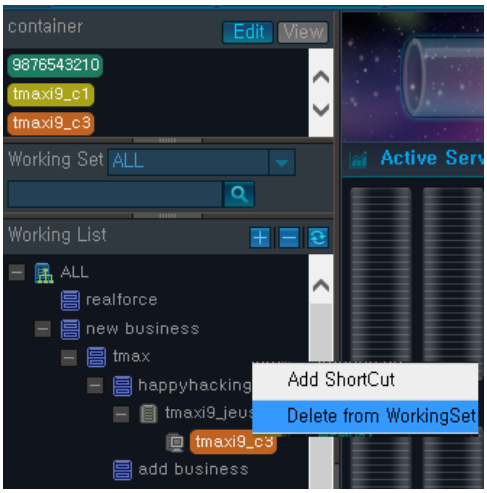
Select the desired business, nodes, and containers from the Working List to assign them to the Working Set.



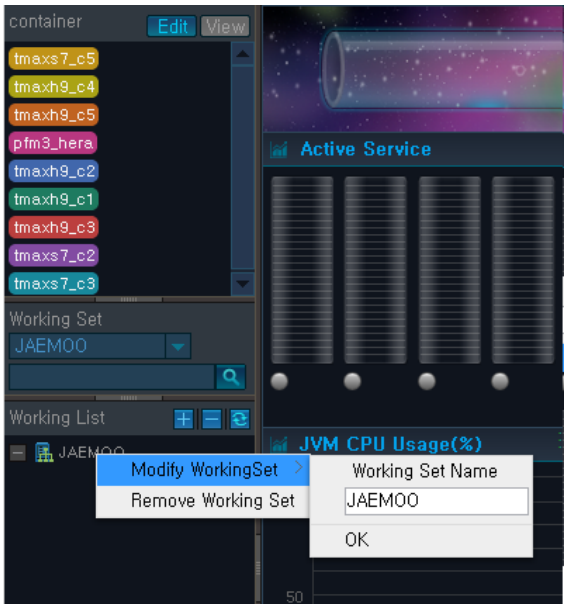
A business that has no nodes or containers cannot be added to a Working Set.


container
Edit
View
tmaxs7_c5
tmaxh9_c4
tmaxh9_c5
pfm3_hera
tmaxh9_c2
tmaxs7_c3
tmaxh9_c1
tmaxh9_c3
tmaxs7_c2
Active Service
Working Set
ALL
Working List
ALL
realforce
new business
tmax
The page at 192.168.1.34:8084 says:
Node or container not found.
OK

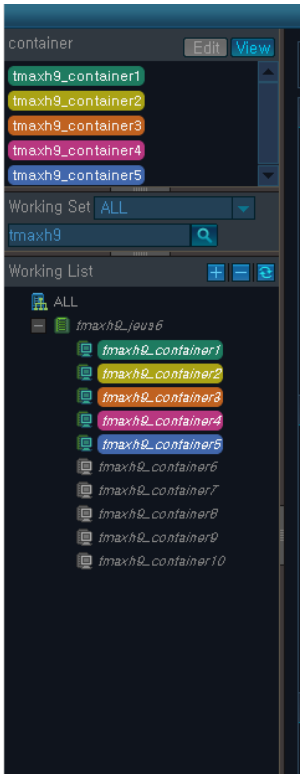
To delete from the Working Set, select the Working Set to delete and then select a business, node, or container from the Working List to delete as shown in the following.



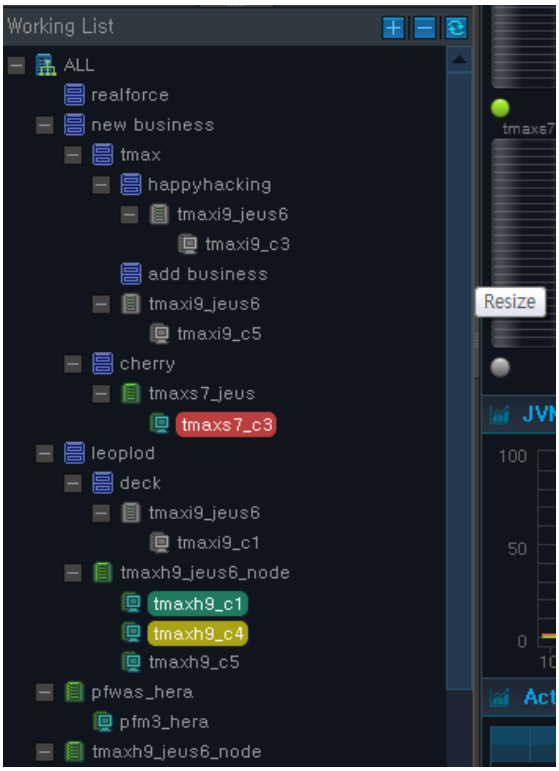
In the following screen, the 'JAEMOO' business from the Working Set is selected. Then the top node (JAEMOO) from the Working List is selected, and the menu items for modifying the set name and deleting the set are shown.



To search for businesses, nodes, and/or containers, enter a search text and then click  . The application, node, and container names that include the search text become italicized in the Working List.



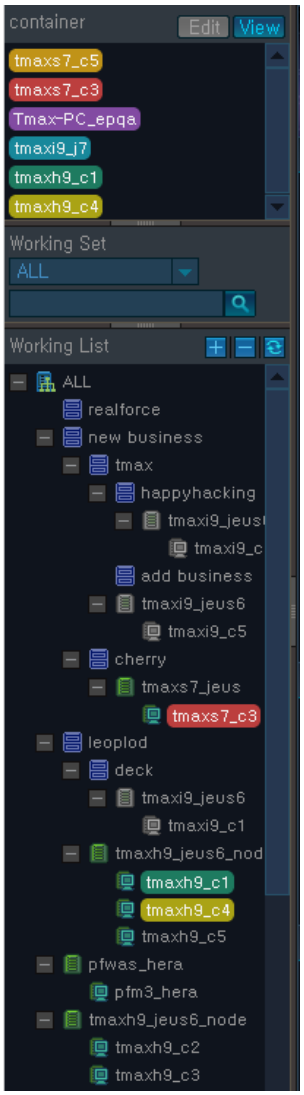
All the names may not become italicized. The user can **Resize** the Working List to increase the width.


Working List
ALL
realforce
new business
tmax
happyhacking
tmaxi9_jeus6
tmaxi9_c3
add business
tmaxi9_jeus6
tmaxi9_c5
cherry
tmaxs7_jeus
tmaxs7_c3
leoplod
deck
tmaxi9_jeus6
tmaxi9_c1
tmaxh9_jeus6_node
tmaxh9_c1
tmaxh9_c4
tmaxh9_c5
pfwas_hera
pfm3_hera
tmaxh9_jeus6_node
Resize
100
50
0

- **Working List**

  The hierarchy of the Working List tree structure is **[Business] > [Node] > [Container]**.

  Depending on the characteristics of the menu item, only one or multiple nodes and containers can be selected. They are displayed in different colors and added to the Working Container. A selected container can be deselected, and it can be re-selected from the Working List.

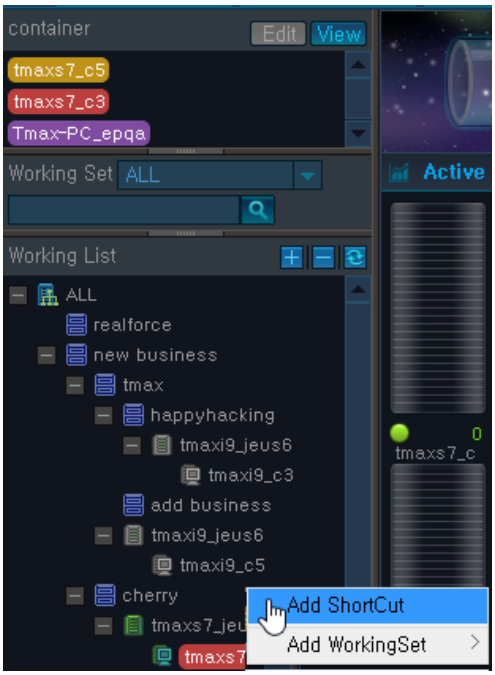


The following is description of icons used in the Working List.

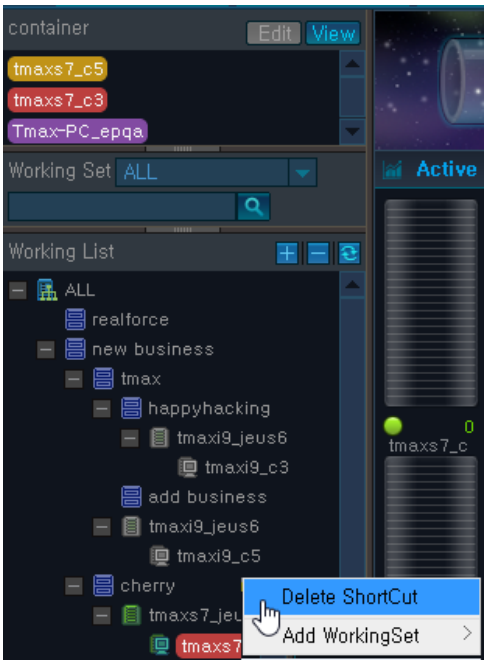
Icon	Description
	Root of the **Working Set** tree. Labeled with the working set name.
	Business system.
 (Gray) /  (Green)	Icon is Gray if Agent is NOT running, and green if Agent is running.

Icon	Description
(Gray) / (Green)	Container status. Same as icon. Green = Running, Gray = Not Running
	Expand the entire tree.
	Close all the nodes except for the root business node.
	Reset the tree.
	Expand all the nodes below the current node.
	Close all the nodes below the current node.

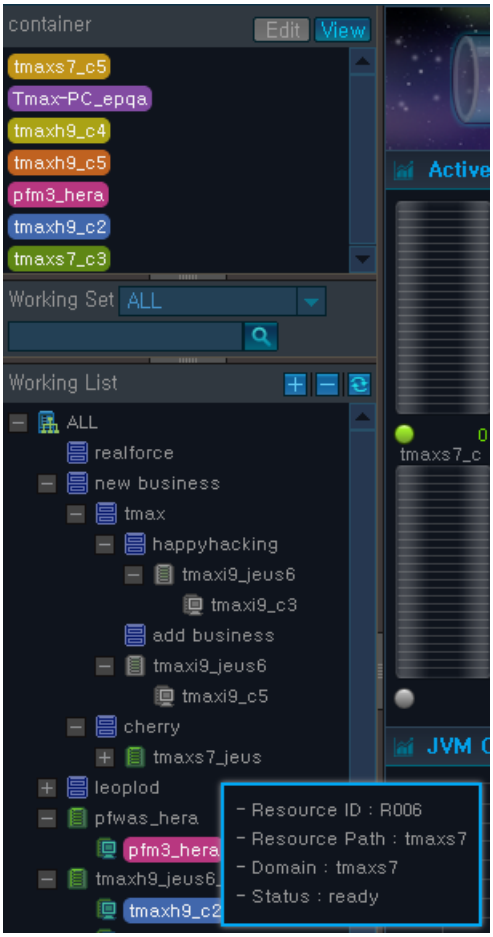
If Working List is in the Edit mode, select and right click on the container, and then click **[Add Shortcut]** to add a container shortcut.



To delete an existing shortcut button for the container, select and right click on the container, and then click **[Delete ShortCut]**.



Using the mouse, hover over a tree node to view information about the business, node, or container.



Property	Description
Resource ID	ID automatically assigned to a resource that is added during the registration of a monitoring target. The Agent is first registered and then the resource is registered to the Agent.
Resource Path	Path of the node's resource.
Domain	Domain information of the target host.
Status	One of ready, not ready, and unknown. Can only perform monitoring in the ready state.

- **Folding Button**

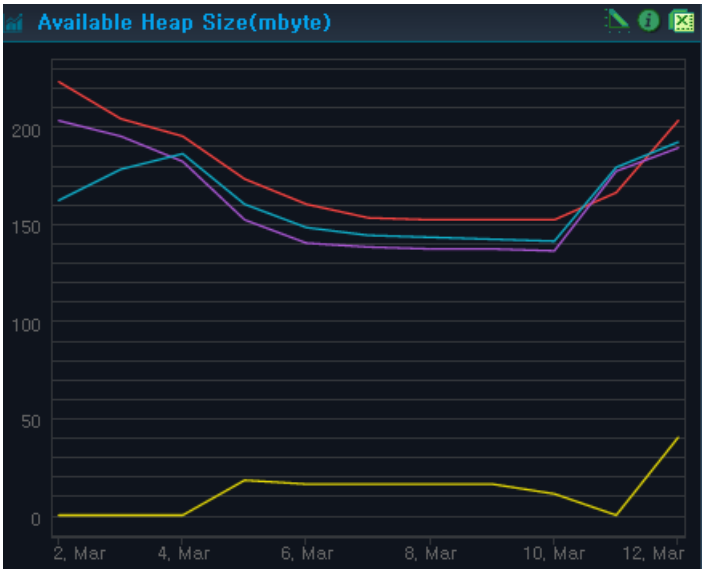
  The Working Container and Working Set can be hidden using the folding buttons in the Working List to expand its area. Re-click on the folding buttons to make them appear again.

   button can be used to hide the Working List and expand the dashboard area where charts and tables are displayed. Re-click on the button to make it appear again.

1.5. Charts and Tables

Provides various functions related to the currently used charts and tables.

[Figure 1.4] Chart Example

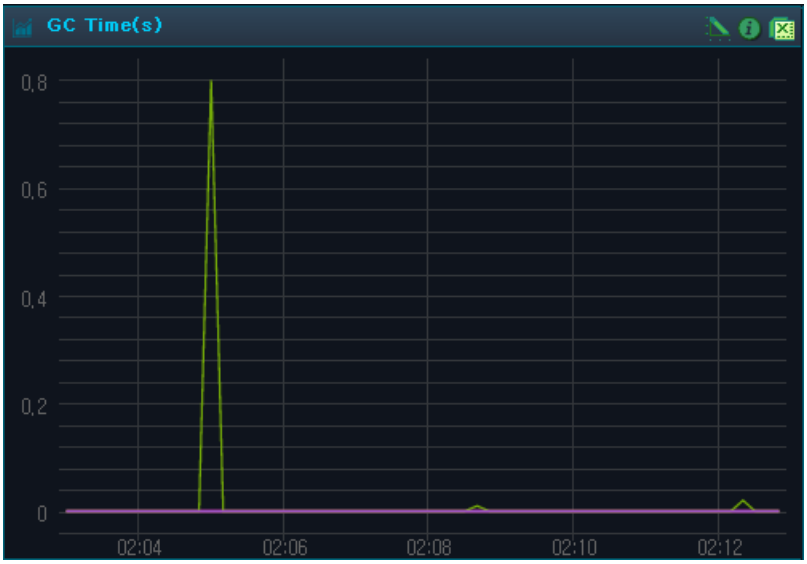


- **Displaying Chart Value**

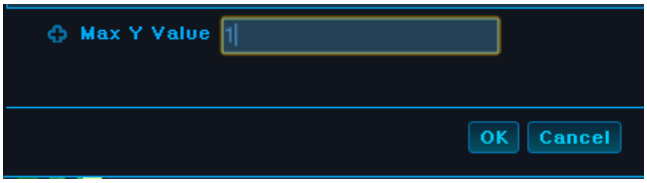
  Hover over the chart with the mouse to see the value displayed.

- **Setting Max. Value of Y Axis**

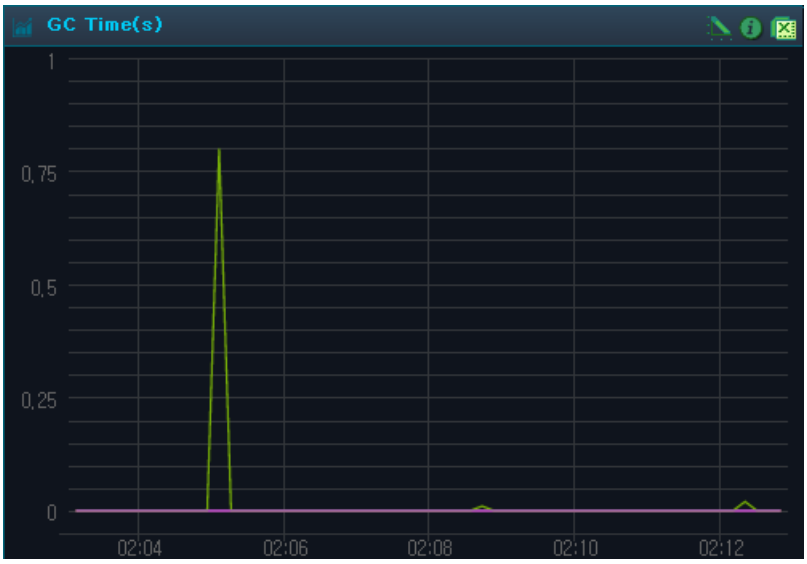
   Click on this icon to set the max value of the Y axis.



The max value of the Y axis is set to 1 in the following.



The chart shows max value of the Y axis as 1. To reset the value, clear the textbox and then click **[OK]**.

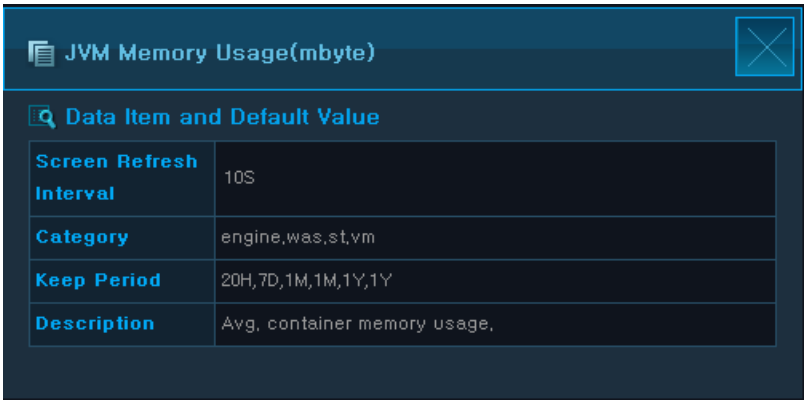


- **Drag & Drop on the Chart**

  Drag & drop on the chart to zoom in on a chart area. This function applies to all charts, but the zoom out function is not provided. Click **[Reset Zoom]** to reset the chart.

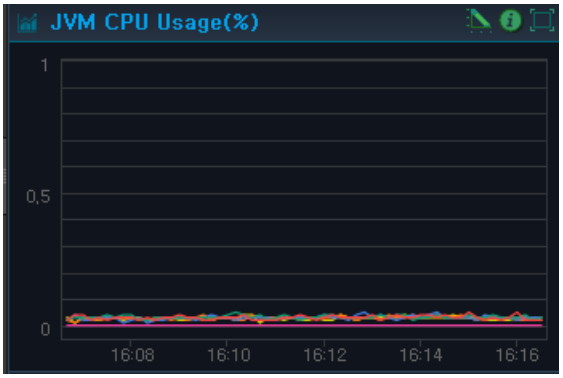
- **Getting Help**

 Click on this icon to see a popup window with detailed information about a chart or table.



- **Zooming in on Chart**

 Click on this icon to see an enlarged view of the chart in a popup window.



- **Saving Chart/Table to Excel**

 Click on this icon to save a chart or table to an excel file.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Resource ID	Stat. Date	Container	SLA Good Cnt.	SLA Normal Cnt.	SLA Bad Cnt.	SLA Critical Cnt.	TPS	Tot. Resp.(ms)	Exec. Cnt.	Succ. Cnt.	Active Cnt.	Fail. Cnt.
2	R017	2013072400	apmdevh1.container1	360	0	0	0	0.1	213	360	undefined	0	0
3	R017	2013072400	apmdevh1.container2	397	1	0	0	0.11	4137	398	undefined	0	0
4	R017	2013072400	apmdevh1.container4	0	0	0	2268	0.63	6824417	2268	undefined	2	0
5	R069	2013072400	tmaxh9.container3	0	0	0	0	0	0	0	undefined	0	0
6	R069	2013072400	tmaxh9.container4	0	0	0	0	0	0	0	undefined	0	0
7	R069	2013072400	tmaxh9.container5	0	0	0	0	0	0	0	undefined	0	0
8	R017	2013072401	apmdevh1.container1	360	0	0	0	0.1	136	360	undefined	0	0
9	R017	2013072401	apmdevh1.container2	399	0	0	0	0.11	4409	399	undefined	0	0
10	R017	2013072401	apmdevh1.container4	0	0	0	2264	0.63	6810823	2264	undefined	2	0
11	R069	2013072401	tmaxh9.container3	0	0	0	0	0	0	0	undefined	0	0
12	R069	2013072401	tmaxh9.container4	0	0	0	0	0	0	0	undefined	0	0
13	R069	2013072401	tmaxh9.container5	0	0	0	0	0	0	0	undefined	0	0
14	R017	2013072402	apmdevh1.container1	360	0	0	0	0.1	153	360	undefined	0	0
15	R017	2013072402	apmdevh1.container2	399	0	0	0	0.11	4826	399	undefined	0	0
16	R017	2013072402	apmdevh1.container4	0	0	0	2264	0.63	6815838	2264	undefined	2	0
17	R069	2013072402	tmaxh9.container3	0	0	0	0	0	0	0	undefined	0	0
18	R069	2013072402	tmaxh9.container4	0	0	0	0	0	0	0	undefined	0	0
19	R069	2013072402	tmaxh9.container5	0	0	0	0	0	0	0	undefined	0	0
20	R017	2013072403	apmdevh1.container1	360	0	0	0	0.1	137	360	undefined	0	0
21	R017	2013072403	apmdevh1.container2	397	0	0	0	0.11	5700	397	undefined	0	0
22	R017	2013072403	apmdevh1.container4	0	0	0	2265	0.63	6815921	2265	undefined	2	0
23	R069	2013072403	tmaxh9.container3	0	0	0	0	0	0	0	undefined	0	0
24	R069	2013072403	tmaxh9.container4	0	0	0	0	0	0	0	undefined	0	0
25	R069	2013072403	tmaxh9.container5	0	0	0	0	0	0	0	undefined	0	0
26	R017	2013072404	apmdevh1.container1	360	0	0	0	0.1	162	360	undefined	0	0
27	R017	2013072404	apmdevh1.container2	409	2	0	0	0.11	7367	411	undefined	0	0
28	R017	2013072404	apmdevh1.container4	0	0	0	2330	0.65	7009121	2330	undefined	2	0
29	R069	2013072404	tmaxh9.container3	0	0	0	0	0	0	0	undefined	0	0
30	R069	2013072404	tmaxh9.container4	0	0	0	0	0	0	0	undefined	0	0
31	R069	2013072404	tmaxh9.container5	0	0	0	0	0	0	0	undefined	0	0
32	R017	2013072405	apmdevh1.container1	360	0	0	0	0.1	146	360	undefined	0	0
33	R017	2013072405	apmdevh1.container2	397	0	0	0	0.11	7253	397	undefined	0	0
34	R017	2013072405	apmdevh1.container4	0	0	0	2263	0.63	6810293	2263	undefined	2	0
35	R069	2013072405	tmaxh9.container3	0	0	0	0	0	0	0	undefined	0	0

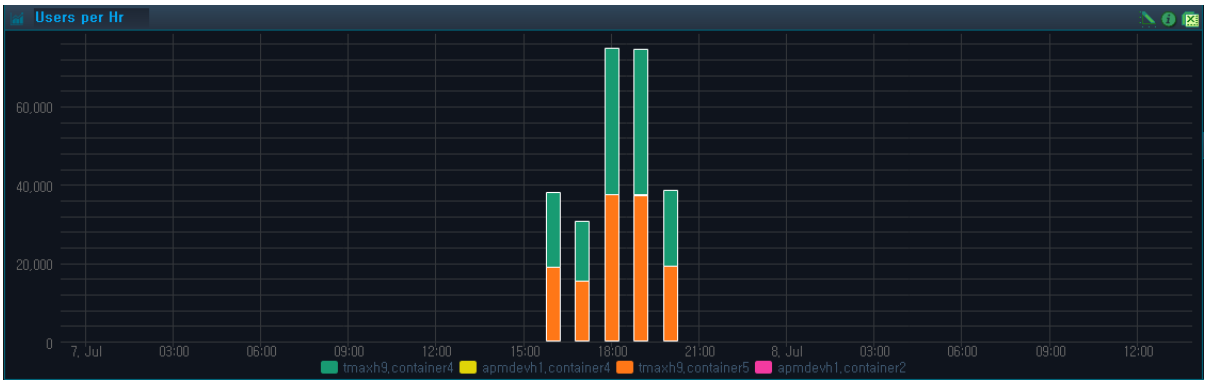
Worksheet

- **Selecting Chart Legend Variables**

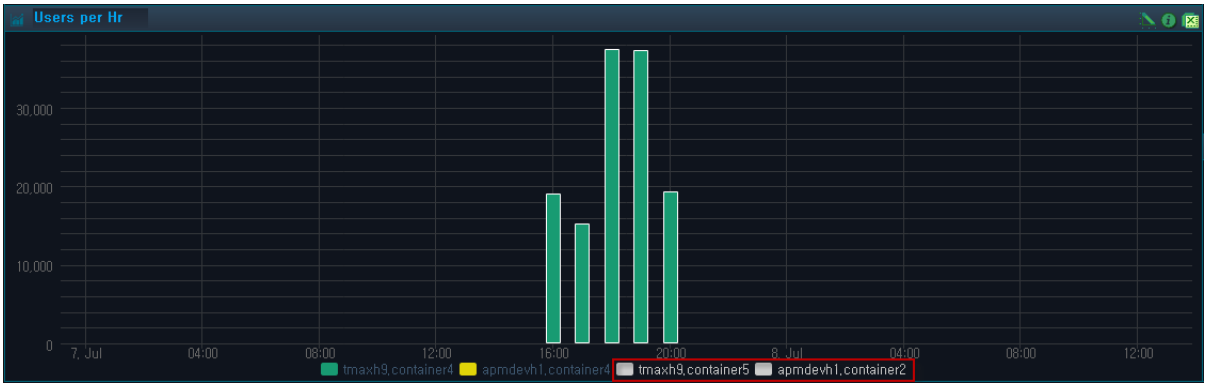
  A user can select the variables for the chart legend. By default, all variables of the legend are displayed on the chart. Select the ones to exclude, and they will appear in white. Reselect the excluded variables to add them back on the chart.

  The following is an example of selecting legend variables.

[Figure 1.5] Legend Variables - Default



[Figure 1.6] Selecting Legend Variables - [Excluding tmax9.container5 and apmdevh1.container2]



Chapter 2. Dashboard

This chapter describes how to search for real-time monitoring target data and servers.

2.1. Overview

The **Dashboard** displays real-time monitoring data and system data for WAS. It provides real-time data for the selected resources for the most recent 10 minute interval. Active properties and transaction view are refreshed every 2 seconds and the rest every 10 seconds.

Dashboard can be accessed from **[WAS] > [Dashboard]**.

[Figure 2.1] Main WAS Dashboard

Dashboard Menu consists of the following two items.

- **Working List**

  Multiple businesses, nodes, and containers can be selected from the Working List. For more detailed information, refer to "1.4. Working List".

- **Monitoring**

Data is displayed in charts and using a summary table by business and instance for each of the following sub menus.

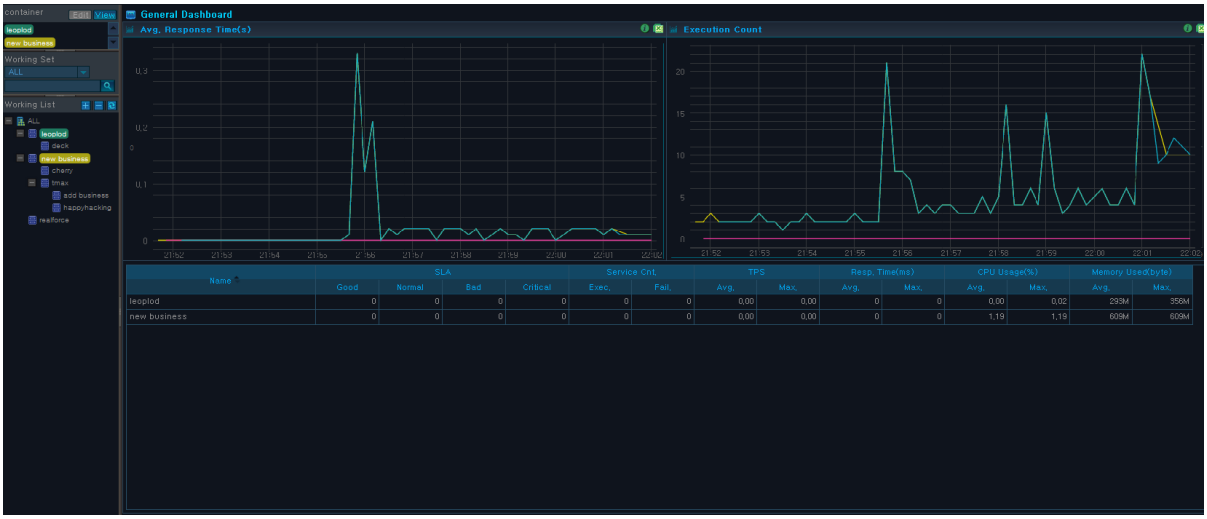
Menu Item	Description
[Summary]	Checks the status of business through its average response time (s), execution count, and service information.
[Active Service]	Monitors and checks the container status of a business using the container's active service bar.
[Real-Time Dashboard]	Checks the hourly status and information of a container in real-time using container-specific active data for user-interested indicators, JVM data, user data, and throughput data using charts and tables.
[User-defined Real-Time Dashboard]	Provides more variety of indicators and data than the [Real-Time Dashboard]. Checks the container's status and information in real-time using charts and tables of active data, host data, JVM data, user data, transaction view data, throughput, and event data.
[User-defined System Dashboard]	Checks the system indicators for each container instances. Checks the node's system status and information in real-time using six different chart types (CPU usage, memory usage, swap memory usage, disk usage, disk I/O, and network I/O).
[Custom Dashboard]	The user creates a custom dashboard and checks for the desired indicators.

2.2. Summary

Summary can be viewed by selecting a business from the **Working List**, and one or more businesses can be selected. The color of the selected business matches that of the Color Table. The data for the selected business is displayed on the average response time chart, execution count chart, and data table. Summary is refreshed every 10 seconds.

Summary can be accessed from **[WAS] > [Dashboard] > [Summary]**.

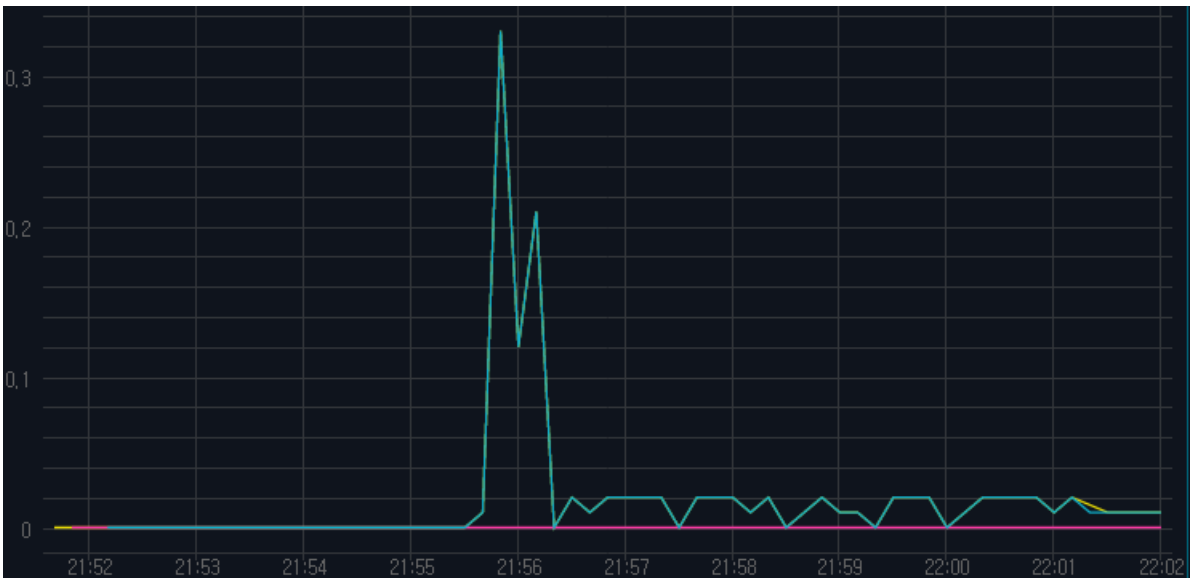
[Figure 2.2] Summary for WAS



Avg. Response Time(s)

Displays a chart of average response times for the selected businesses.

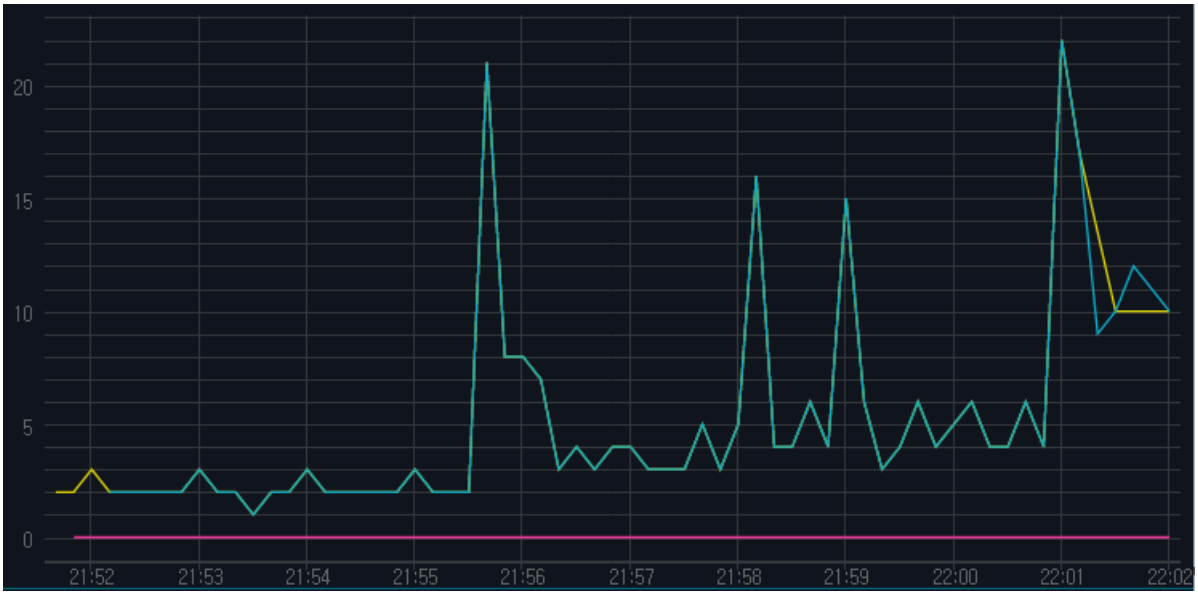
Avg. Response Time(s) chart can be used to compare the response times of multiple businesses, and detect and handle issues for businesses with long response times. The X axis shows the most recent 10 minute period, and the Y axis shows the avg. response time(s).



Execution Count

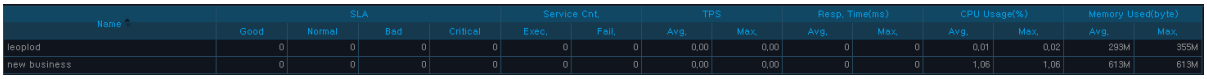
Displays a chart of execution counts for the selected businesses.

The Execution Count chart can be used to compare and monitor the throughput data of multiple businesses.



General Table by Business

Displays a table of various data for each business. For information about defining a business and configuring SLA (Service Level Agreement) threshold, refer to "SysMaster Administrator Guide".



Name	SLA				Service Cnt.		TPS		Resp. Time(ms)		CPU Usage(%)		Memory Used(byte)	
	Good	Normal	Bad	Critical	Exec.	Fail.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.
leoplod	0	0	0	0	0	0	0,00	0,00	0	0	0,01	0,02	293M	355M
new business	0	0	0	0	0	0	0,00	0,00	0	0	1,05	1,05	613M	613M

Property	Description
SLA Good	Number of services with Good response time according to SLA. (Response Time, between 0 ~ 1000ms)
SLA Normal	Number of services with Normal response time according to SLA. (Response Time, between 1000 ~ 3000ms)
SLA Bad	Number of services with Bad response time according to SLA. (Response Time, between 3000 ~ 5000ms)
SLA Critical	Number of services with Critical response time according to SLA. (Response Time, more than 5000ms)
Exec. Service Cnt.	Service execution count. (Successes + failures)

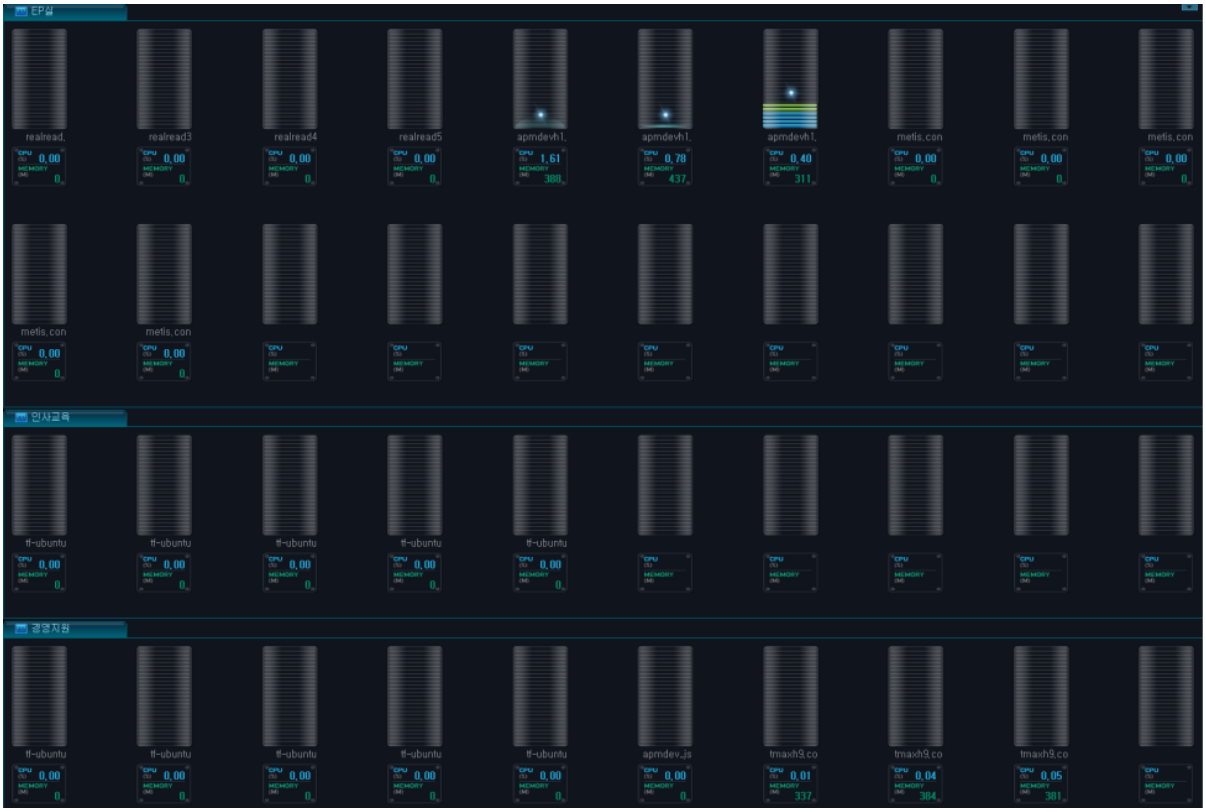
Property	Description
Fail. Service Cnt.	Number of failed services.
Avg. TPS	Average number of services processed per second.
Max. TPS	Maximum number of services processed per second.
Avg. Resp. Time (ms)	Average service response time.
Max Resp. Time	Max service response time.
Avg. CPU Usage(%)	CPU usage.
Max CPU Usage(%)	Max CPU usage.
Avg. Memory Used(byte)	Memory usage.
Max. Memory Used(byte)	Max memory usage.

2.3. Active Service

Active Service is refreshed every 2 seconds, and containers are displayed in the units of business.

Active Service can be accessed from **[WAS] > [Dashboard] > [Active Service]**.

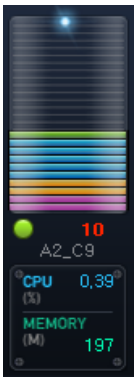
[Figure 2.3] Dashboard - Active Service Screen



The **Active Service Bar** dynamically represents real-time data for each container grouped by business.

Active properties provide data for currently running services, such as EJB, Servlet, etc. Basic information including Container Name, CPU Usage(%), and Memory(M) are displayed. The number of running services in each container is displayed with an active bar. Different colors are used to distinguish services with different execution times.

[Figure 2.4] Active Service Bar



Classification	Description
Active Bar	Displays the status of the container process with the color according to the execution time. – Green: Service(thread) with execution times between 0 ~ 1000ms. – Blue: Service(thread) with execution times between 1000 ~ 5000ms. – Orange: Service(thread) with execution times between 5000 ~ 10000ms. – Pink: Service(thread) with execution times greater than 10000ms. – Gray: Container process is down.
Number	Number of active bars. The color displayed represents the service with the longest execution time.

2.4. Real-Time Dashboard

Real-time dashboard displays **Active Data, JVM Data, User Data**, and **Throughput Data** in charts and tables for monitoring purposes.

Real-time dashboard can be accessed from **[WAS] > [Dashboard] > [Real-Time Dashboard]**.

[Figure 2.5] Dashboard - Real-Time Dashboard Screen

Active Data

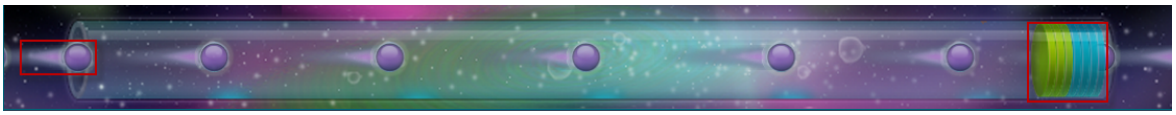
Active charts and tables are refreshed every 2 seconds.

- **Active Speed Bar**

  Space theme is used as a background with a planet ( ) representing a running transaction that moves from the left to the right. The number of planets increases proportionally to the number of transactions.

  For each selected container, a number of disks proportional to the total number of running services are accumulated starting from the right end of the cylinder. Up to 80 transactions are displayed in descending order of service execution time.

[Figure 2.6] Active Speed Bar



- **Active Service Bar**

  Active services are shown as containers starting from the left in the order they were selected by the user. Up to 30 containers can be displayed. For more information, refer to "2.3. Active Service".

[Figure 2.7] Active Service Bar

- **Active Top N**

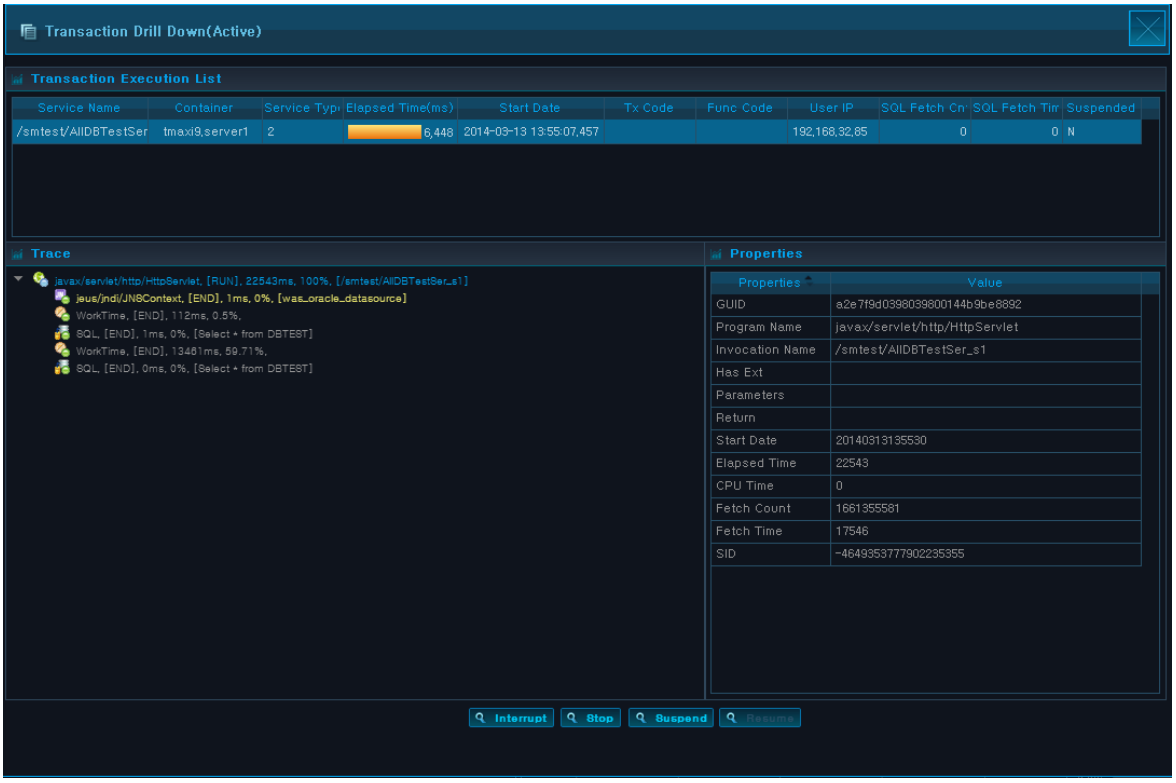
  List of selected containers' active services are displayed in the order of increasing execution time. Up to 20 services can be listed for each container.

[Figure 2.8] Active Top N

Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Container	Information about the container where the transaction originated from.
Elapsed Time(ms)	Service processing duration. Since Top N is refreshed every two seconds starting from when the user makes a request from a browser, different Elapsed Time(ms) can be displayed for different users within a two second interval.

Detailed transaction information can be viewed on a popup window by selecting a service row. Basic transaction information and resource are shown on the top, and transaction trace and trace properties are shown on the bottom.

[Figure 2.9] Active Top N - Active Service



– **Transaction Execution List**

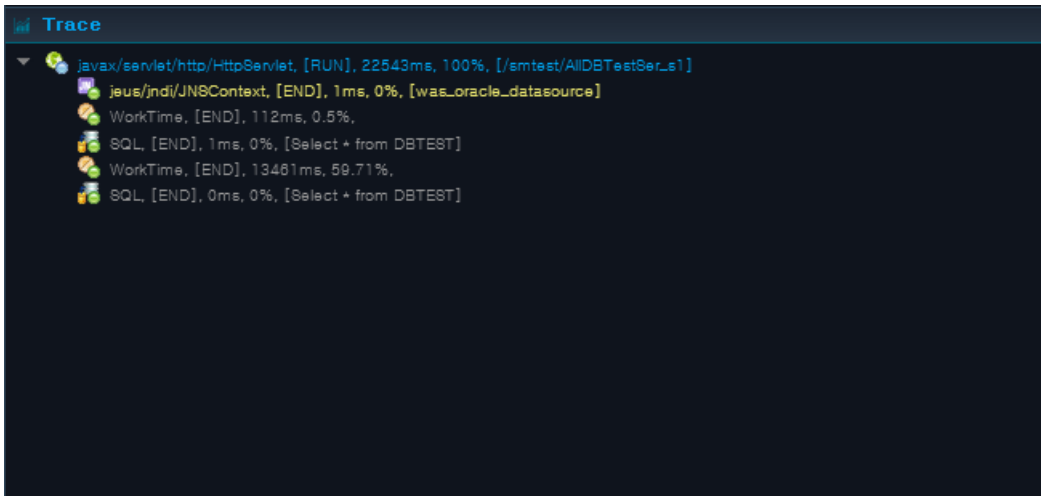
The following is description of the properties.

Property	**Description**
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Container	Information about the container where the transaction originated from.
Service Type	Transaction service type. (user, servlet, JDBC, TP(external transaction), JNDI, EJB, Header, etc.)
Elapsed Time(ms)	Service processing duration. Elapsed Time value in Transaction Execution List can be different from that in the Trace tree. Data in Transaction Execution List is retrieved when user clicks on the parent screen, and data in the

Property	Description
	Trace tree is retrieved when user clicks a row in Transaction Execution List.
Start Date	Service start date and time.
Tx Code	User-defined transaction code recorded in the service.
User IP	IP address of the user who made the service request.
SQL Fetch Cnt.	Number of DB fetches recorded in the service.
SQL Fetch Time (ms)	Total DB fetch processing time recorded in the service.
Suspended	Enable starting and stopping of server processes? (Y/N)

– **Trace**

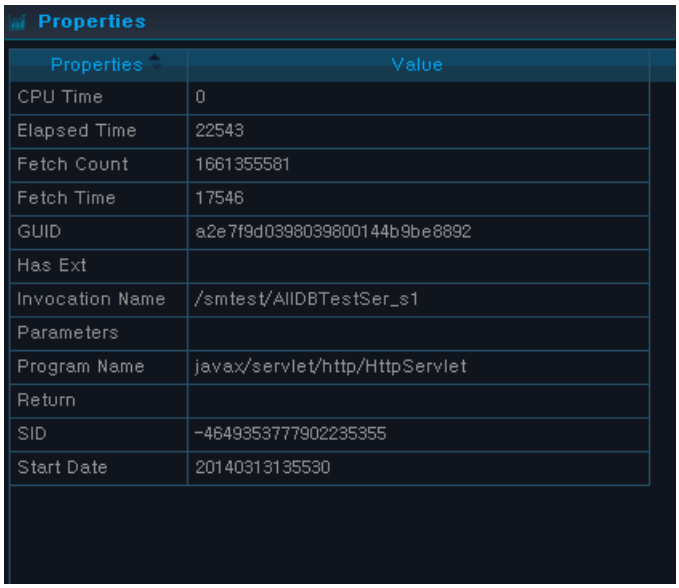
The trace tree can be accessed from the **Trace Menu**. Each trace consists of the **Program Name, Status, Execution Time,% Occupied**, and **Service Name**.



– **Properties**

Select a service from the transaction execution list to see the **General Properties** table, and select a trace to see the **Detailed Properties** table.

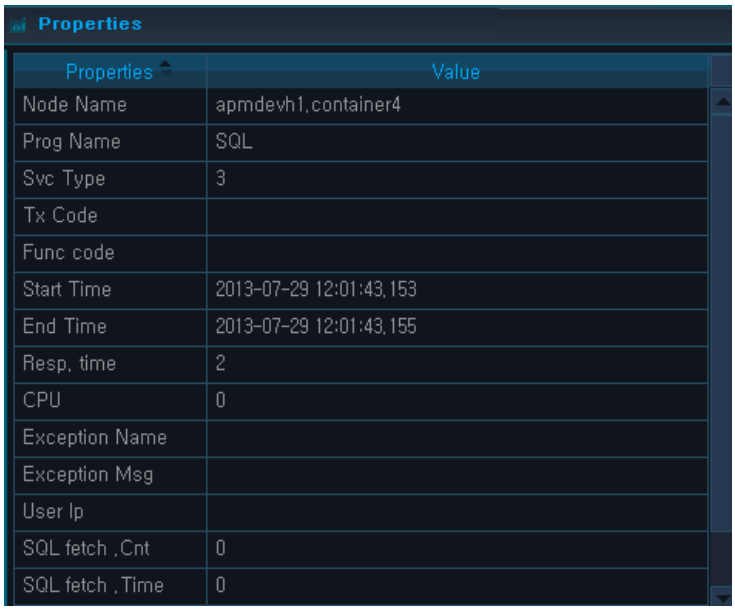
- General Properties



The following is description of the general properties.

Property	Description
GUID	Transaction ID for J2EE container.
Program Name	Invoked program name. (Servlet class name, EJB class name, etc.)
Invocation Name	Calling name of the Invocation.
Has Ext	Enable saving SQL full text.
Parameters	Configured parameters for Invocation call.
Return	Configured return value for Invocation call.
Start Date	Service start time.
Elapsed Time	Service processing duration.
CPU Time	Average CPU time used by the service.
Fetch Count	SQL Fetch execution count.
Fetch Time	SQL Fetch execution duration.
SID	Unique ID for DB instance.

- Detailed Properties



The following is description of the detailed properties.

Property	**Description**
Node Name	Node name of the service.
Svc Type	Transaction service type. (user, servlet, JDBC, TP(external transaction), JNDI, EJB, Header, etc.)
Prog Name	Invoked program name. (Servlet class name, EJB class name, etc.)
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
sql	Executed SQL query.
CPU	Average CPU time used by the service.
Start Time	Service start time.
End Time	Service termination time.
Resp. Time	Average service response time.
Exception Name	Name of the exception that occurred in the service.
Exception Msg	Exception message that occurred in the service.
User IP	IP address of the user who requested the service.
SQL fetch .Cnt	SQL Fetch execution count.
SQL fetch .Time	SQL Fetch execution duration.
Param	Configured parameters for Invocation call.

– **Service Control Buttons**

The following is description of service control buttons.

Button	Description
[Interrupt]	Interrupt currently running service.
[Stop]	Forcibly terminate currently running service.
[Suspend]	Suspend currently running service.
[Resume]	Resume service.

Java Virtual Machine (JVM) Data

JVM data is refreshed every 10 seconds, and is displayed as follows.

[Figure 2.10] Java Virtual Machine (JVM) Chart

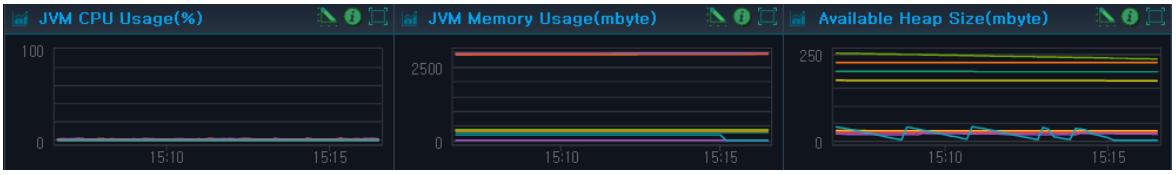
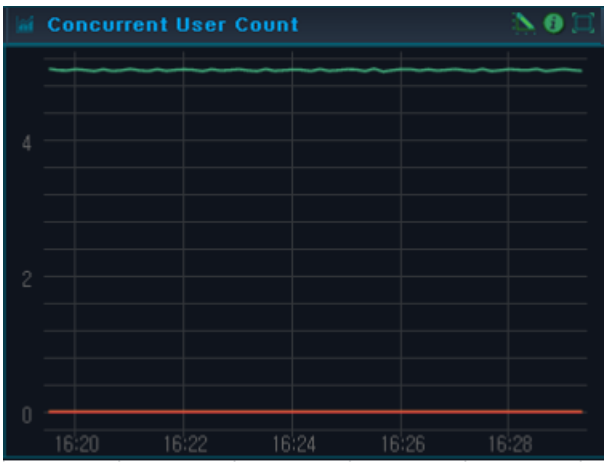


Chart	Description
JVM CPU Usage (%)	JVM CPU usage of the container selected in the Working List. Data is refreshed every 10 seconds. (X axis: Most recent 10 minute period, Y axis: JVM CPU Usage(%))
JVM Memory Usage (mbyte)	JVM memory usage of the container selected in the Working List. Data is refreshed every 10 seconds. (X axis: Most recent 10 minute period, Y axis: JVM Memory Usage (MB))
Available Heap Size (mbyte)	Available JVM heap memory size of the container selected in the Working List. Data is refreshed every 10 seconds. (X axis: Most recent 10 minute period, Y axis: Available heap size (MB))

User Data

The number of concurrent users is refreshed every 10 seconds, and real-time data is displayed as in the following. (X axis: Most recent 10 minute period, Y axis: Concurrent user count)

[Figure 2.11] Concurrent User Count



Since HTTP protocol does not maintain connections with users, the following equation based on the performance theory is used to determine the number of concurrent users.

```
ConcurrentUser = Throughput(tps) * {Resp.Time(sec) + ThinkTime(sec)}
```

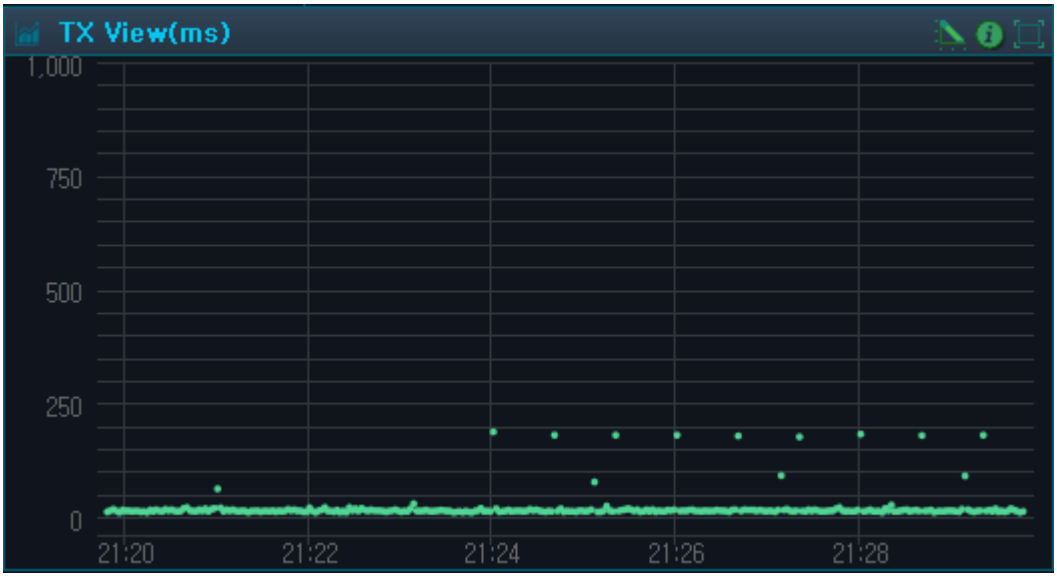
The accuracy of the previous equation increases with increased load.

Transaction View Data

Transaction View Data displays transactions processed per unit of time (ms) using scatter plot to show distribution of the currently executing transaction. TX View is refreshed every 2 seconds.

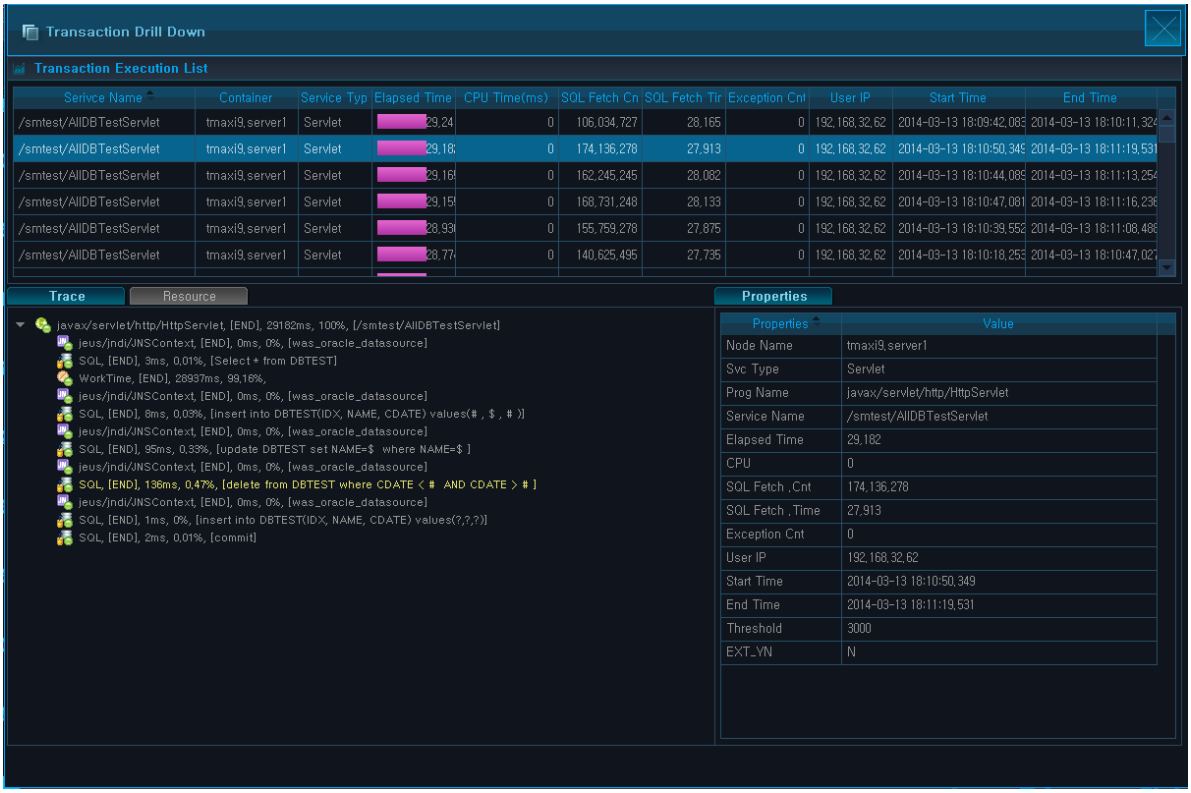
(X axis: Most recent 10 minute period, Y axis: response time(ms))

[Figure 2.12] TX View(ms)



To view more detailed transaction information, use Drag & Drop method to select the area and view detailed information on a popup window. Basic transaction information and resource are displayed on the top, and transaction trace and trace properties are shown on the bottom.

[Figure 2.13] Transaction Drill Down



- **Transaction Execution List**

The following is description of the transaction execution list properties.

Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Container	Information about the container where the transaction originated from.
Service Type	Transaction service type. (user, servlet, JDBC, TP(external transaction), JNDI, EJB, Header, etc.)
Elapsed Time	Duration for service processing. Elapsed Time value in Transaction Execution List can be different from that in the Trace tree. Data in Transaction Execution List is retrieved when user clicks on the parent screen, and data in the Trace tree is retrieved when user clicks a row in Transaction Execution List.
CPU Time (ms)	Average CPU time used by the service.
SQL Fetch Cnt.	Number of DB Fetches recorded in the service.
SQL Fetch Time (ms)	Total DB Fetch processing time recorded in the service.
Exception Cnt.	Number of exception occurrences recorded in the service.
User IP	IP address of the user who requested the service.
Start Time	Service start time.
End Time	Service termination time.

- **Trace**

  The trace tree can be accessed from the **Trace Menu**. Each trace consists of the **Program Name, Status, Execution Time, % Occupied**, and **Service Name**.

  Select a service from the transaction execution list to see the **General Properties** table, and select a trace to see the **Detailed Properties** table.

– General Properties

The following is description of the general properties.

Property	**Description**
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Node Name	Service node name.
Svc Type	Transaction service type. (user, servlet, JDBC, TP(external transaction), JNDI, EJB, Header, etc.)
Prog Name	Service program name. (JSP URL, Servlet Class Name, EJB Class Name, etc.)
Tx Code	User-defined transaction code recorded in the service.
Func code	Requested service code.
Resp.time	Average service response time.
CPU	Average CPU time used by the service.
SQL fetch.Cnt	DB Fetch execution count.
SQL fetch.Time	SQL Fetch execution time.
Exception Cnt	Number of exception occurrences recorded in the service.
User ID	ID of the user who requested the service.
User IP	IP address of the user who requested the service.
Start Time	Service start time.
End Time	Service termination time.
Threshold	Response time threshold for transaction data collection. Threshold is configured for each service URL of a container.
EXT_YN	Enable saving SQL full text? (Y/N)

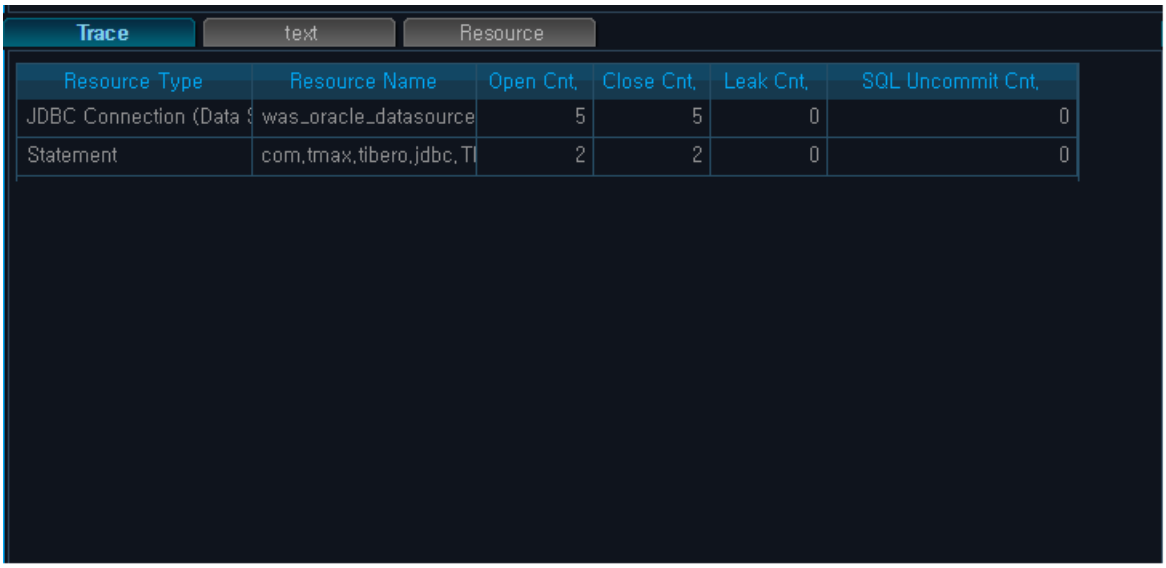
– Detailed Properties

The following is description of the detailed properties.

Property	Description
EXT_YN	Enable saving SQL full text? (Y/N)
Node Name	Service node name.
Prog Name	Service program name. (JSP URL, Servlet Class Name, EJB Class Name, etc.)
Svc Type	Transaction service type. (user, servlet, JDBC, TP(external transaction), JNDI, EJB, Header, etc.)
Tx Code	User-defined transaction code recorded in the service.
Func code	Requested service code.
Start Time	Service start time.
End Time	Service termination time.
Resp.time	Average service response time.
CPU	Average CPU time used by the service.
Exception Name	Name of the exception that occurred in the service.
Exception Msg	Exception message that occurred in the service.
User IP	IP address of the user who requested the service.
SQL fetch.Cnt	DB Fetch execution count.
SQL fetch.Time	SQL Fetch execution time.
param	Configured parameters for Invocation call.
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
sql	Executed SQL query.

- **Resource**

The resource information can be accessed from the **Resource Menu**.

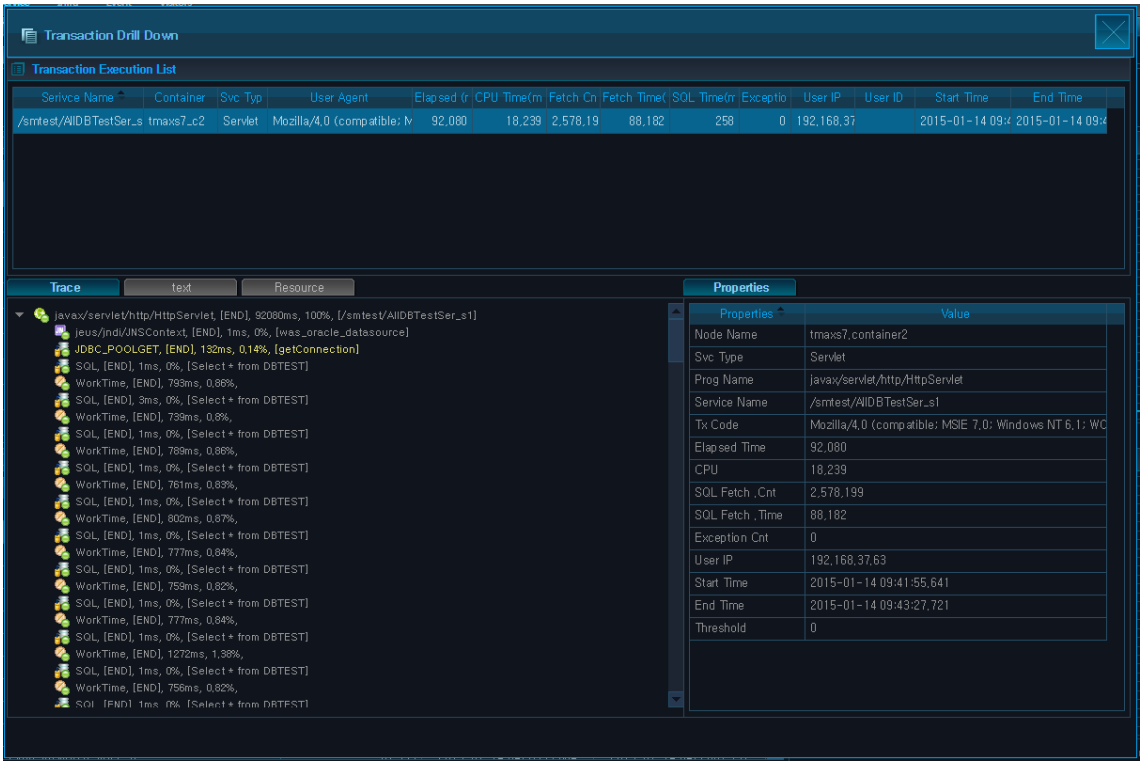


The following is description of the resource properties.

Property	**Description**
Resource Type	Resource type. (Was, System)
Resource Name	Resource name.
Open Cnt.	Number of times resource was obtained. (E.g.: JDBC JDBC Connection Open)
Close Cnt.	Number of times resource was returned.
Leak Cnt.	Leak occurrence count. (calculated by subtracting Open Cnt. from Close Cnt.)
SQL Uncommit Cnt.	Number of SQLs that have not been committed.

If the trace property is SQL, SQL statement from the existing trace location can be viewed by selecting the SQL row from the properties table.

[Figure 2.14] Transaction Drill Down - SQL View



When **[binding]** is clicked, the parameter values (in yellow) of the related query statement are displayed as **Binding Variables '?'**, and when re-clicked, previous parameter values are shown. Click **[close]** to return to the trace screen.

Throughput

JVM is refreshed every 10 seconds, and real-time service throughput is shown on a chart.

[Figure 2.15] Throughput Screen

Chart	Description
TPS	Transactions per second for the container selected in the Working List. (X axis: Most recent 10 minute period, Y axis: Transactions Per Second)
Avg. Response Time(s)	Avg. response time for the container selected in the Working List. (X axis: Most recent 10 minute period, Y axis: Avg. response time(s))

2.5. User-defined Real-Time Dashboard

Using charts and tables, real-time dashboard dynamically displays various monitoring data, including **Active Service Data, Host Data, Java Virtual Machine Data, User Data, Transaction View Data, Throughput**, and **Event Data**. It provides additional host data and more variety of chart indicators compared to the Real-Time Dashboard.

Real-time user dashboard can be accessed from **[WAS] > [Dashboard] > [User-defined Real-Time Dashboard]**.

[Figure 2.16] Dashboard - User-defined Real-Time Dashboard Screen

Active Service Data

Active Service Data is refreshed every 2 seconds. It consists of **Active Speed Bar, Active Service Bar**, and **Active Top N**. For description of each item, refer to "Active Service Data" in "2.4. Real-Time Dashboard".

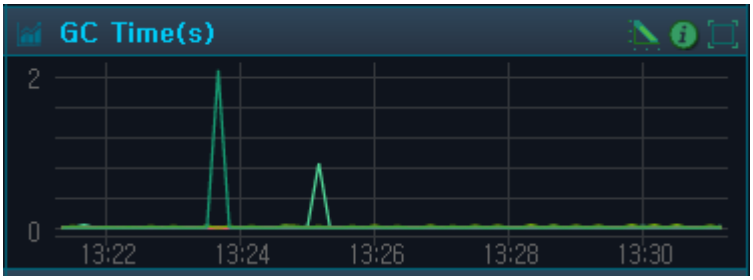
JVM Data

JVM Data is displayed for the container selected in the Working List. It consists of **JVM CPU Usage(%)**, **JVM Memory Usage(mbyte)**, **Available Heap Size (mbyte)**, and **GC Time (s)**. For description of each item except for GC Time(sec), refer to "JVM Data" in "2.4. Real-Time Dashboard".

- **GC Time(s)**

  Captures the times within the given time frame spent in Garbage Collection.

  [Figure 2.17] GC Time(s) Screen



Host Data

Host Data displays data for the system where WAS is installed. It captures the system data for the selected container or node in the Working List. The host status data is collected for each Agent, and is displayed on a graph in units of an Agent. Data is refreshed every 10 seconds.

[Figure 2.18] Host Data Screen

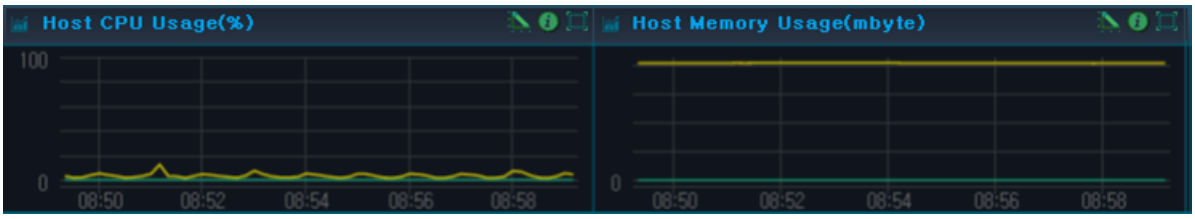


Chart	Description
Host CPU Usage (%)	CPU usage of the container system selected in the Working List. For multiple CPUs, the average value is displayed. Displays snapshot data that is refreshed every 10 seconds. (X axis: Most recent 10 minute period, Y axis: Host CPU usage(%))
Host Memory Usage (mbyte)	Memory usage of the host of the container selected in the Working List. Displays snapshot data that is refreshed every 10 seconds. (X axis: Most recent 10 minute period, Y axis: Host memory usage (MB))

Throughput

Throughput displays throughput data of the container selected in the Working List.

Throughput consists of **TPS, Avg. Response Time (s), Current Day's TPS, Current Day's Avg. Response Time (s)**. For more information about TPS and Avg. Response Time, refer to "Throughput" in "2.4. Real-Time Dashboard".

- **TPS**

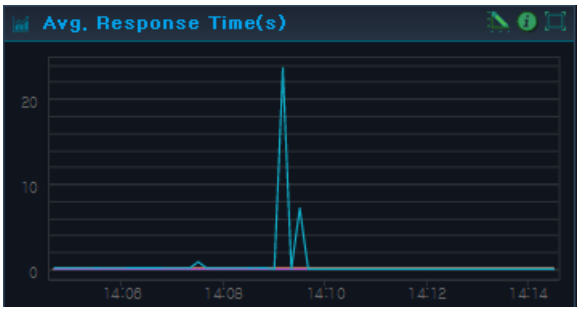
  Displays TPS (Transactions per second) data of each container for the most recent 24 hour period based on the Master clock.

[Figure 2.19] TPS Screen

- **Avg. Response Time(s)**

  Displays average service response time data of each container for the most recent 24 hour period based on the Master clock.

[Figure 2.20] Avg. Response Time(s) Screen



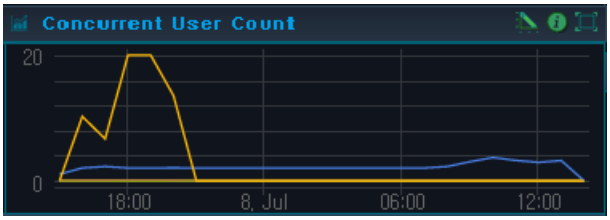
User Data

User Data displays user data of the container selected in the Working List. It consists of the **Number of Concurrent Users**, **Current Day's Number of Concurrent Users**, **Number of Users Per Hour**, and **Number of Event Occurrences Per Hour**. For more information about the number of concurrent users, refer to "User Data" in "2.4. Real-Time Dashboard".

- **Concurrent User Count**

  Displays number of concurrent users of each container for the most recent 24 hour period based on the Master clock.

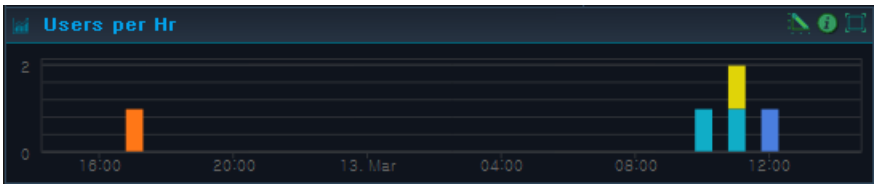
[Figure 2.21] Concurrent User Count Screen



- **Users Per Hr**

  Displays the number of users per hour by container using a bar chart.

[Figure 2.22] Users Per Hr Screen



- **Event Occurrences per Hr**

  Displays the number of event occurrences per hour by container.

[Figure 2.23] Event Occurrences per Hr

TX View Data

For information about transaction view, refer to "Transaction View Data" in "2.4. Real-Time Dashboard".

2.6. User-defined System Dashboard

Data for the system where WAS is installed can be viewed from **[User-defined System Dashboard]**. It displays data for the host system which includes the node selected in the Working List. Data is refreshed every 10 seconds.

User-defined system dashboard can be accessed from **[Tmax] > [Dashboard] > [User-defined System Dashboard]**.

[Figure 2.24] Dashboard - User System Dashboard Screen

Chart	Description
CPU Usage (%)	Displays all CPU utilization data items. – sys : System – user : user – wait : wait (X axis: CPU Name, Y axis: CPU Usage(%))
Memory Usage (mbyte)	Memory size being used by the host. – free : free memory size – real alloc : real memory allocation – real active : active real memory – virtual alloc : virtual memory allocation – virtual active : active virtual memory (X axis: Most recent 10 minute period, Y axis: Memory usage (MB))

Chart	Description
CPU Trend(%)	Server CPU trends for 10 minute period. (X axis: Most recent 10 minute period, Y axis: CPU usage (%)
Disk Usage(%)	Disk usage in percentage. (X axis: System path, Y axis: Disk usage (%))
Disk I/O(bps)	Disk I/O in bps. (X axis: Disk I/O name, Y axis: Disk I/O (bps))
Network I/O(ipkts)	Network I/O in ipkts. (X axis: Network I/O name, Y axis: Network I/O (pkts))

2.7. Custom Dashboard

In **Custom Dashboard**, a user can select the desired dashboard and create a menu for it.

Select a widget from **[ADMIN] > [Custom Dashboard] > [Dashboard]**, and adjust its size and location. After arranging the dashboard, save the dashboard to register it in the **[Dashboard]** menu. For detailed information, refer to "SysMaster Administrator Guide".

The following is an example of a Custom Dashboard.

[Figure 2.25] Dashboard - Custom Dashboard (Example)

Chapter 3. Event Real-Time Analysis

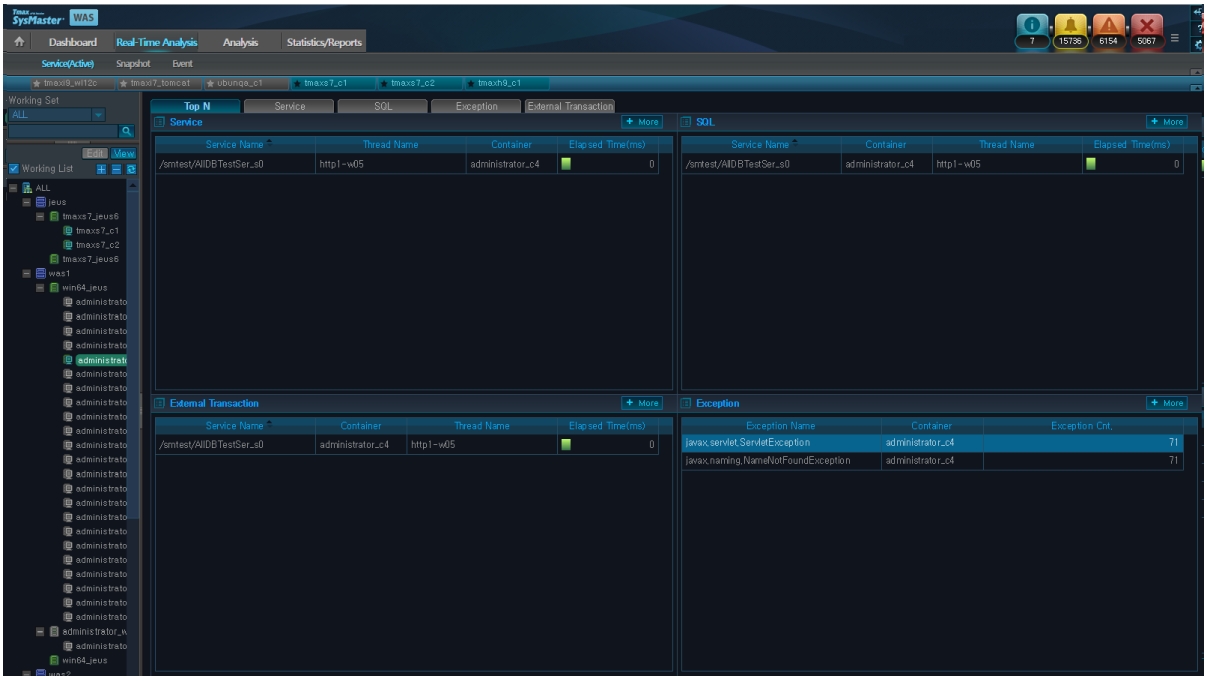
This chapter describes the **Real-Time Analysis** screen.

3.1. Overview

Real-Time Analysis screen provides detailed information needed for real-time monitoring of servers and WASs that are registered in SysMaster. The main function of **Real-Time Analysis** screen is to provide detailed information. When failure is detected during normal monitoring activity from the dashboard, **Real-Time Analysis** screen can be used to analyze the status of a single container.

Real-Time Analysis can be accessed from **[WAS] > [Real-Time Analysis]**.

[Figure 3.1] Real-Time Analysis Screen



Real-Time Analysis Menu consists of the following two items.

- **Working List**

  A single container can be selected from the Working List to analyze its status in real-time. For more information, refer to "1.4. Working List".

- **Monitoring / Analysis**

Data is displayed in charts and using summary tables by business and instance for each of the following sub menus.

Menu Item	Description
[Service(Active)]	Check real-time data for Service, SQL, exception, and external transactions.
[Snapshot]	Check real-time data for threads, class loaders, collection objects, files, sockets, sessions, and environment variables.
[Event]	Check current day's event statuses and list of events.

3.2. Service(Active)

Service(Active) provides information related to the currently running services such as EJBs, Servlets, etc.

Service(Active) can be accessed from **[WAS] > [Real-Time Analysis] > [Service]** and consists of the following tabs.

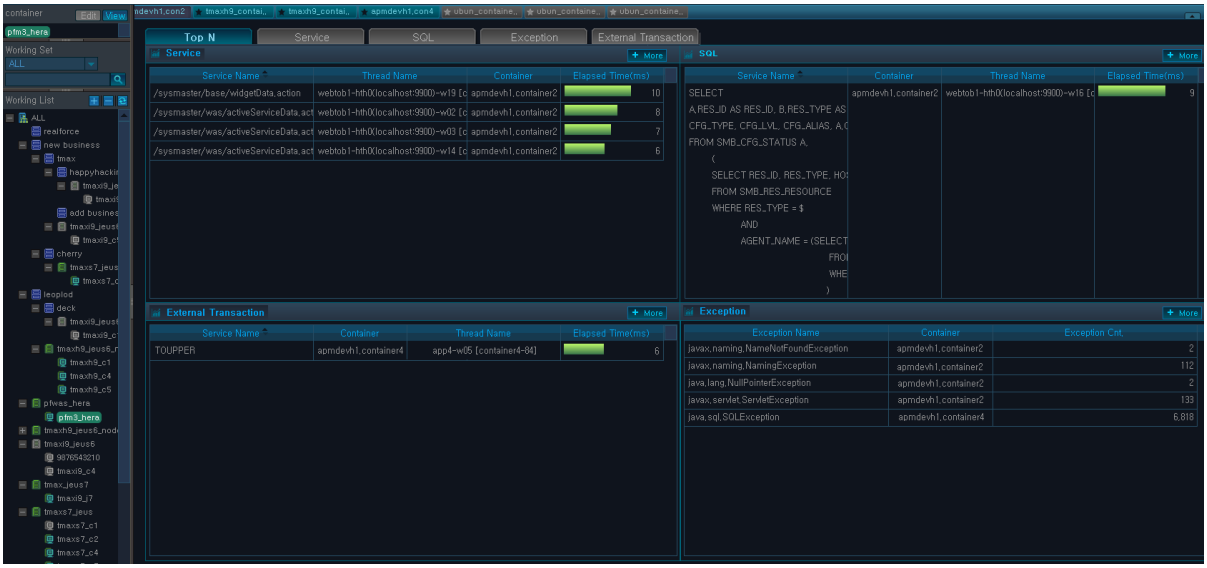
- **[Top N]**
- **[Service]**
- **[SQL]**
- **[Exception]**
- **[External Transaction]**

Click **[+ More]** from each table to move to the related tab to see more detailed information.

3.2.1. Top N

Top N displays a table of Top N services, SQLs, exceptions, and external transactions for the selected container. 'Elapsed Time' value is used to select the Top N rows. Click **[Search]** from each table to move to the related tab to see more detailed information.

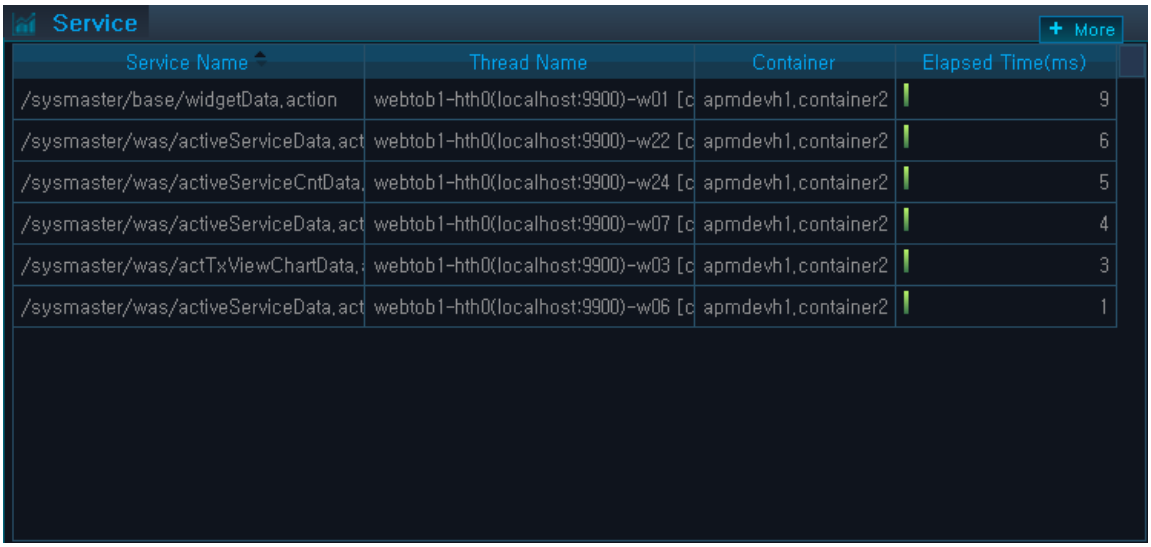
[Figure 3.2] Real-Time Analysis - Active Service



Service

Displays a list of currently running services in the descending order of 'Elapsed Time' for the selected container.

[Figure 3.3] Real-Time Analysis - Active Service - Top N - Service Table



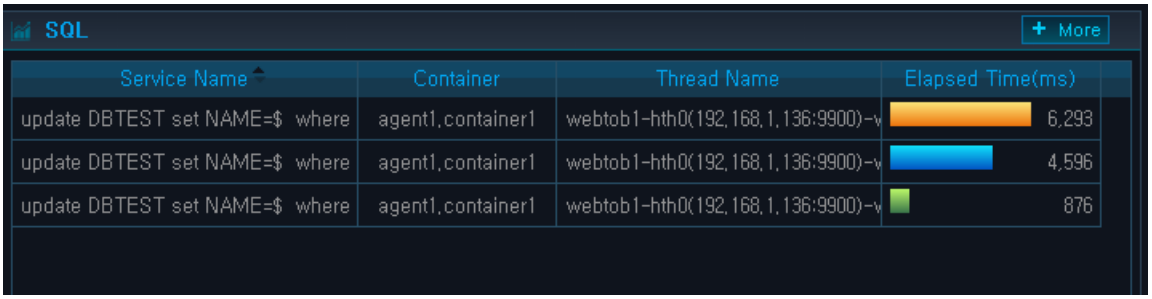
Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Thread Name	Thread name of the currently running service.
Container	Information about the container where the transaction originated from.
Elapsed Time(ms)	Duration for service processing.

Detailed service information can be viewed on a popup window by selecting a specific service. For more information about Active Service popup window, refer to "Active Top N" in "2.4. Real-Time Dashboard".

SQL

Displays SQL queries that are currently executing.

[Figure 3.4] Real-Time Analysis - Active Service - Top N - SQL Table

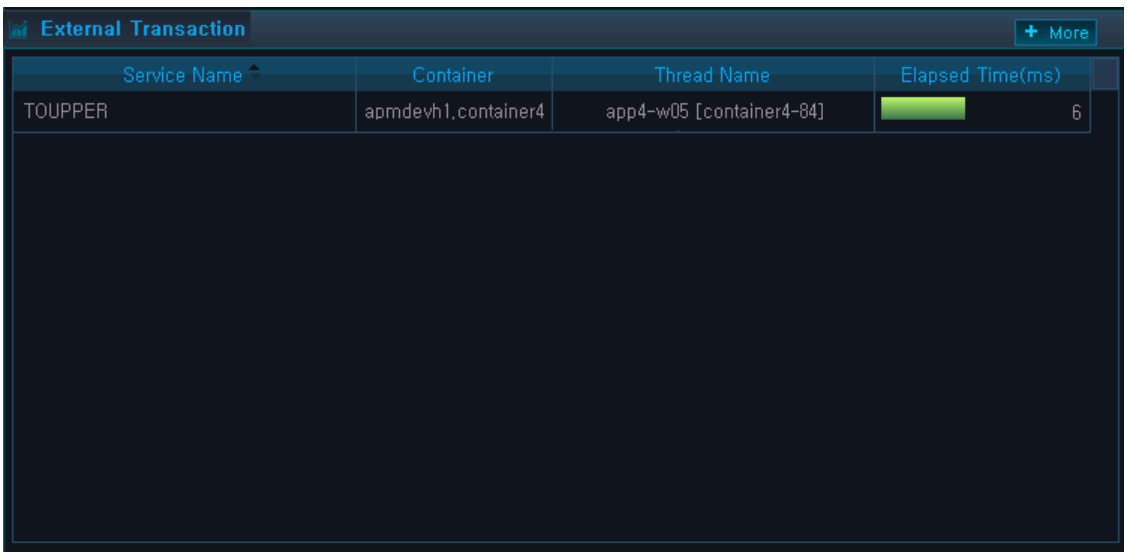


Property	Description
Service Name	Request name that identifies the service. (SQL query)
Container	Information about the container where the transaction originated from.
Thread Name	Thread name of the currently running service.
Elapsed Time(ms)	Duration for service processing.

External Transaction

Displays external transaction data that is received through TP.

[Figure 3.5] Real-Time Analysis - Active Service - Top N - External Transaction Table



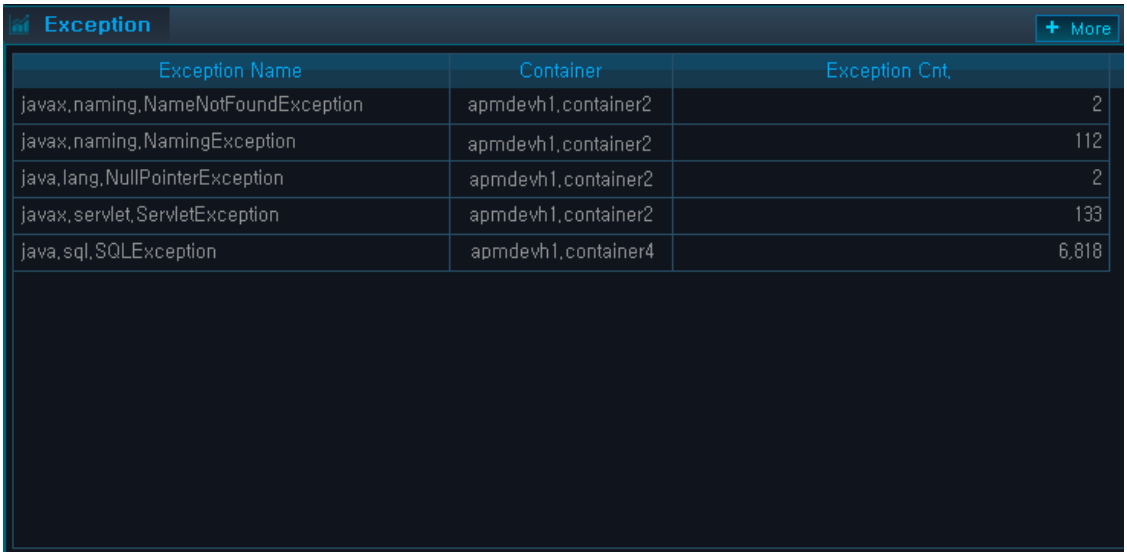
Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)

Property	Description
Container	Information about the container where the transaction originated from.
Thread Name	Thread name of the currently running service.
Elapsed Time(ms)	Service processing duration.

Exception

Displays a list of Java EE exception types (SQLException, NullPointException, ServletException, SocketException, FileIOException, etc.) and their number of occurrences. Note that the exceptions that are handled by Try/Catch blocks are excluded.

[Figure 3.6] Real-Time Analysis - Active Service - Top N - Exception Table



Property	Description
Exception Name	Type of exception that occurred in the transaction.
Container	Information about the container where the transaction originated from.
Exception Cnt.	Number of exception occurrences.

3.2.2. Service

Service displays a list of running services for the selected container in the descending order of 'Elapsed Time.' It contains more detailed information than the **Service** table in **[Top N]** tab.

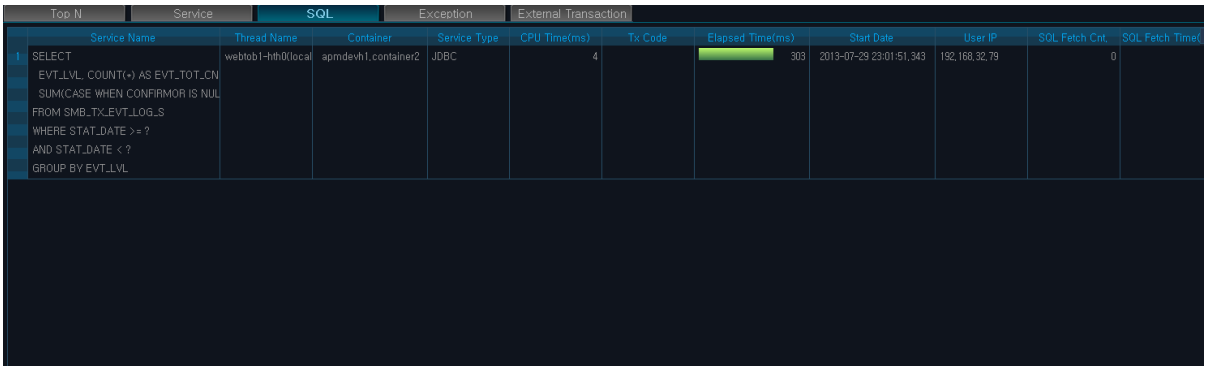
[Figure 3.7] Real-Time Analysis - Active Service - Service

Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Thread Name	Thread name of the currently running service.
Container	Information about the container where the transaction originated from.
Service Type	Transaction service type. (user/servlet/JDBC/TP(external transaction)/JNDI/EJB/Header, etc.)
CPU Time(ms)	Average CPU time used by the service.
Tx Code	User-defined transaction code recorded in the service.
Elapsed Time(ms)	Service processing duration.
Start Date	Service start date and time.
User IP	IP address of the user who requested the service.
SQL Fetch Cnt	DB Fetch execution count.
SQL Fetch Time(ms)	SQL Fetch execution time.

3.2.3. SQL

SQL displays currently executing SQL queries in detail.

[Figure 3.8] Real-Time Analysis - Active Service - SQL

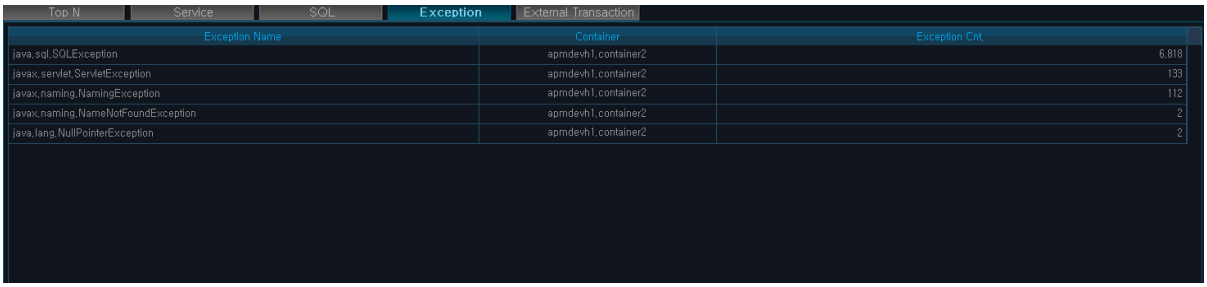


Property	Description
Service Name	Currently executing SQL.
Thread Name	Thread name of the currently running service.
Container	Information about the container where the transaction originated from.
Service Type	Transaction service type. (user/servlet/JDBC/TP(external transaction)/JNDI/EJB/Header, etc.)
CPU Time(ms)	Average CPU time used by the service.
Tx Code	User-defined transaction code recorded in the service.
Elapsed Time(ms)	Service processing duration.
Start Date	Service start date and time.
User IP	IP address of the user who requested the service.
SQL Fetch Cnt.	DB Fetch execution count.
SQL Fetch Time(ms)	SQL Fetch execution time.

3.2.4. Exception

Exception displays a list of Java EE exception types (SQLException, NullPointException, ServletException, SocketException, FileIOException, etc.) and their number of occurrences. Note that only the exceptions that thrown are handled here.

[Figure 3.9] Real-Time Analysis - Active Service - Exception



Property	Description
Exception Name	Type of exception that occurred in the transaction.
Container	Information about the container where the transaction originated from.
Exception Cnt.	Number of exception occurrences.

3.2.5. External Transaction

External Transaction displays external transaction data that is received through TP.

[Figure 3.10] Real-Time Analysis - Active Service - External Transaction

Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Thread Name	Thread name of the currently running service.
Container	Information about the container where the transaction originated from.
Service Type	Transaction service type. (user/servlet/JDBC/TP(external transaction)/JNDI/EJB/Header, etc.)
CPU Time(ms)	Average CPU time used by the service.
Tx Code	User-defined transaction code recorded in the service.

Property	Description
Elapsed Time(ms)	Service processing duration.
Start Date	Service start date and time.
User IP	IP address of the user who requested the service.
SQL Fetch Cnt	DB Fetch execution count.
SQL Fetch Time(ms)	SQL Fetch execution time.

3.3. Snapshot

Snapshot displays various data by saving snapshots of the execution. It shows the current snapshot data of the currently running container at the time of the search.

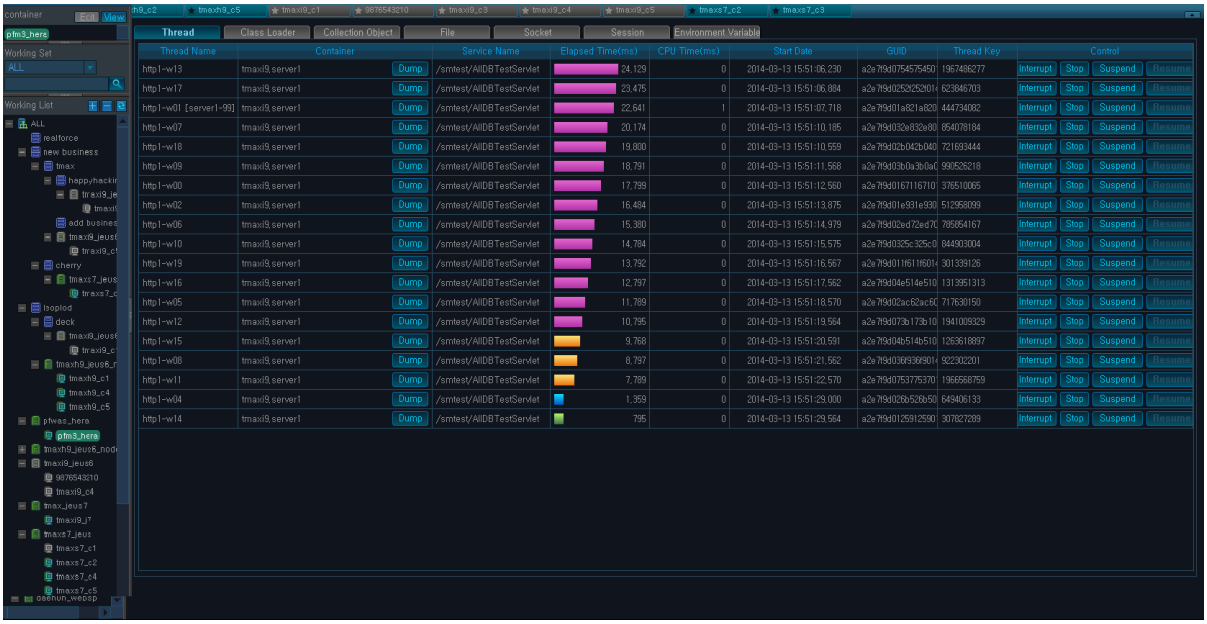
Snapshot can be accessed from **[WAS] > [Real-Time Analysis] > [Snapshot]** and consists of the following tabs.

- **[Thread]**
- **[Class Loader]**
- **[Collection Object]**
- **[File]**
- **[Socket]**
- **[Session]**
- **[Environment Variable]**

3.3.1. Thread

Thread displays thread data for the currently running service of the container, and the container's thread dump data. Thread dump data can be used to check for statuses such as BLOCKED, DEADLOCK, etc., and stack traces of the thread can be analyzed to resolve abnormal thread conditions.

[Figure 3.11] Real-Time Analysis - Snapshot - Thread



Property	Description
Thread Name	Thread name of the currently running service.
Container	Information about the container where the transaction originated from.
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Elapsed Time(ms)	Service processing duration.
CPU Time(ms)	Average CPU time used by the service.
Start Date	Service start date and time.
Control	Thread status configuration.

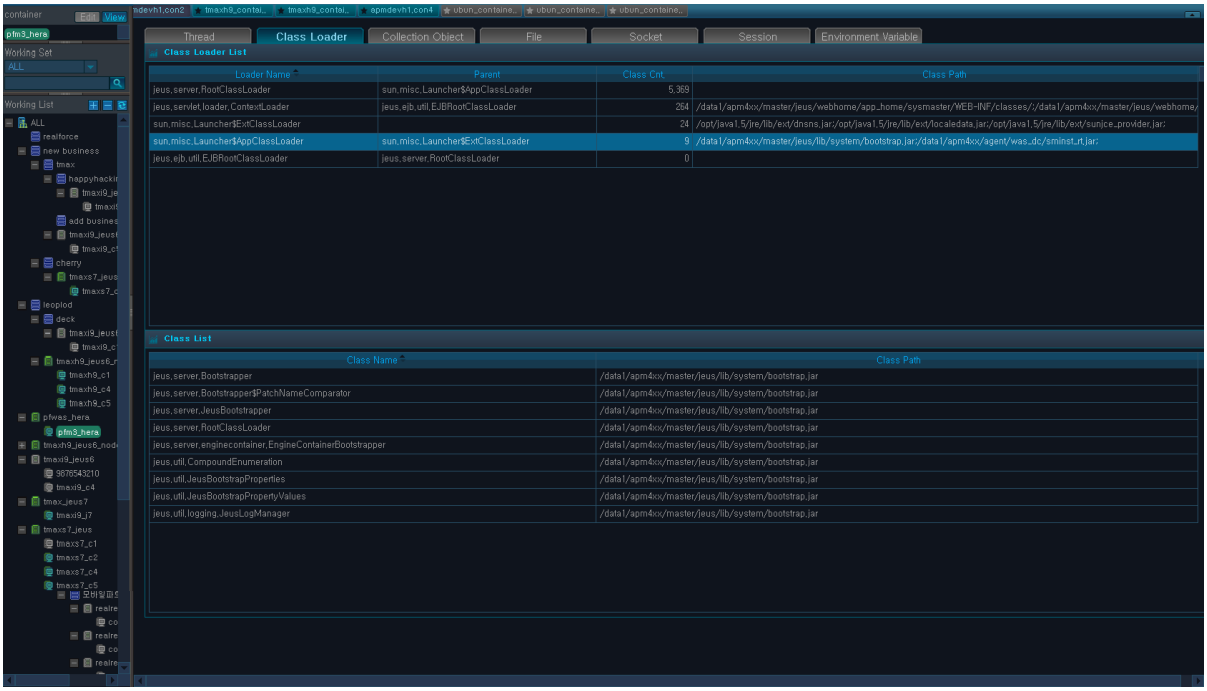
The following is description of the service control buttons.

Button	Description
[Resume]	Calls Thread Resume method to resume the thread.
[Suspend]	Calls Thread Suspend method of stop the thread.
[Stop]	Calls Thread Stop method to forcibly stop the thread.
[Interrupt]	Calls Thread Interrupt method to stop a thread that has been in the wait state for a long time.
[Dump]	Gets the Thread Dump and displays its data.

3.3.2. Class Loader

Class Loader displays information about all classes that have been loaded. Class Loader's main function is to load the class during runtime without stopping the VM. It shows the total number of times each Class has been loaded. When a row is selected from the **Class Loader List**, a Class List table that contains a detailed list of classes for the class loader is displayed below.

[Figure 3.12] Real-Time Analysis - Snapshot - Class Loader



- **Class Loader List**

  The following is description of the Class Loader List Properties.

Property	Description
Loader name	Class loader name.
Parent	Parent class loader.
Class Cnt.	Number times the class has been loaded.
Class Path	Class path.

- **Class List**

  The following is description of the Class List Property.

Property	Description
Class Name	Loaded class name.

Property	Description
Class Path	Class path.

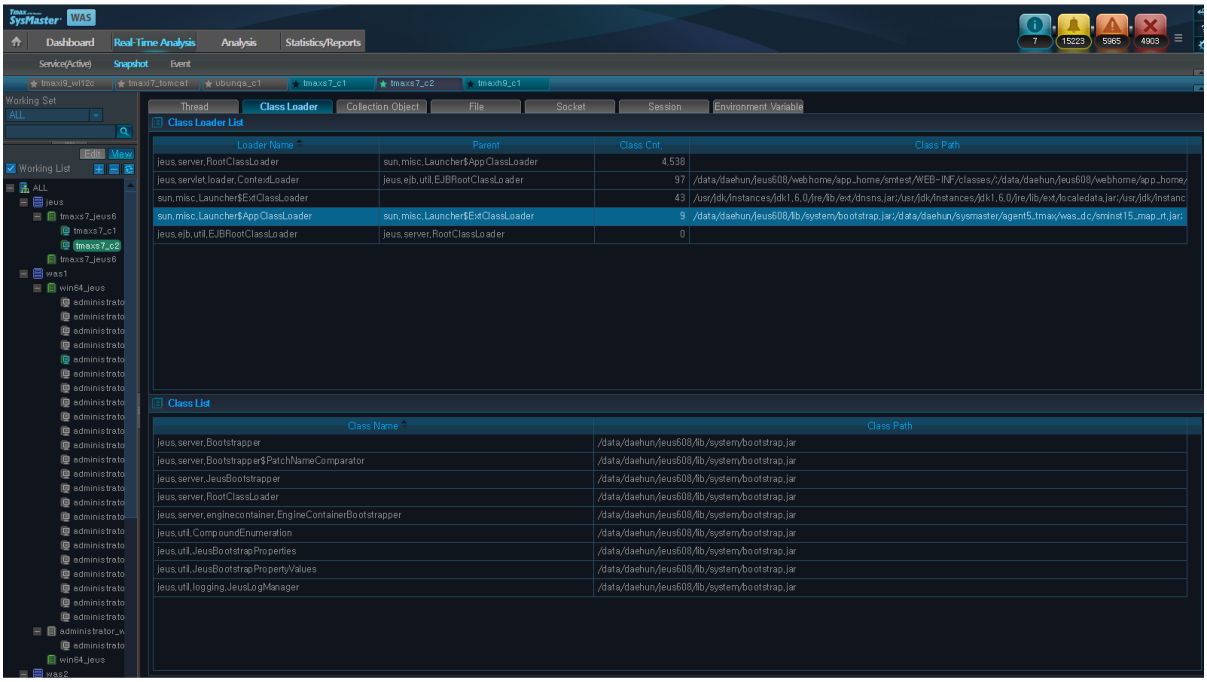
3.3.3. Collection Object

Collection Object displays a list of collection objects, such as Vertor, HaspMap, and LinkedhaspMap, that are detected in the container.

Active Collection List displays the number of instances and objects created for each collection type. When an error is detected in a collection object, the class name and stack trace information can be used to determine the origination of the error.

When a row is selected from the Active Collection List, stack trace is displayed in the Collection Stack Trace table below.

[Figure 3.13] Real-Time Analysis - Snapshot - Collection Object

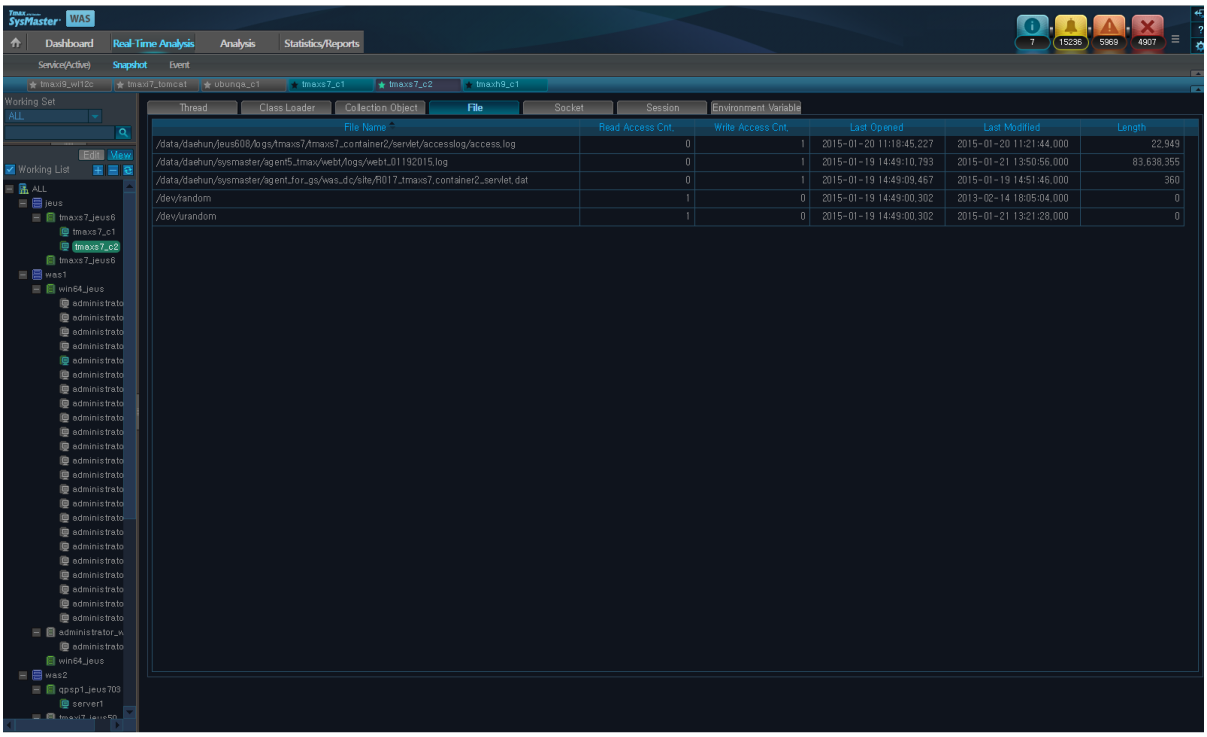


Property	Description
Container	The name of the container of the service where a collection object is detected.
Class Name	Collection implementation class name.
Object Cnt.	The number of times java object was registered to the Collection.
Created On	Time when Collection Object is created.
Trace Created On	Time when Collection Object's call trace is created.
Stack Trace	Whether to track the stack trace for where Collection was created.

3.3.4. File

Log files for each container contain information about the files that are being used by the container, and the file's I/O status and I/O byte data. They can be used to locate a particular file used by the container through the file path information, and to get the file properties.

[Figure 3.14] Real-Time Analysis - Snapshot - File

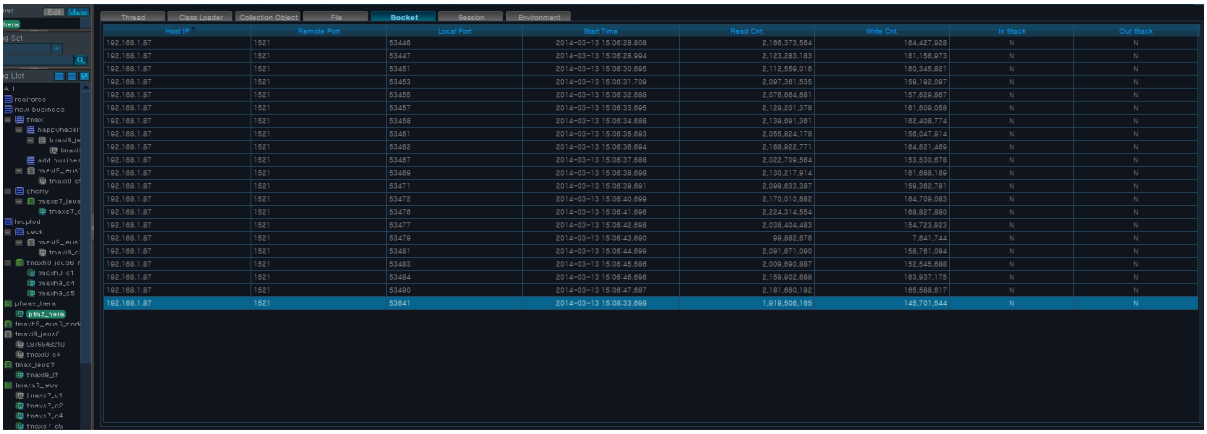


Property	Description
File Name	File name and path.
Read Access Cnt.	Number of file reads.
Write Access Cnt.	Number of file writes.
Last Opened	Last accessed date and time of the file.
Last Modified	Last modified date and time of the file.
Length	File length. (byte)

3.3.5. Socket

Socket displays information about container sockets, including I/O byte for each socket, socket creation date, etc.

[Figure 3.15] Real-Time Analysis - Snapshot - Socket

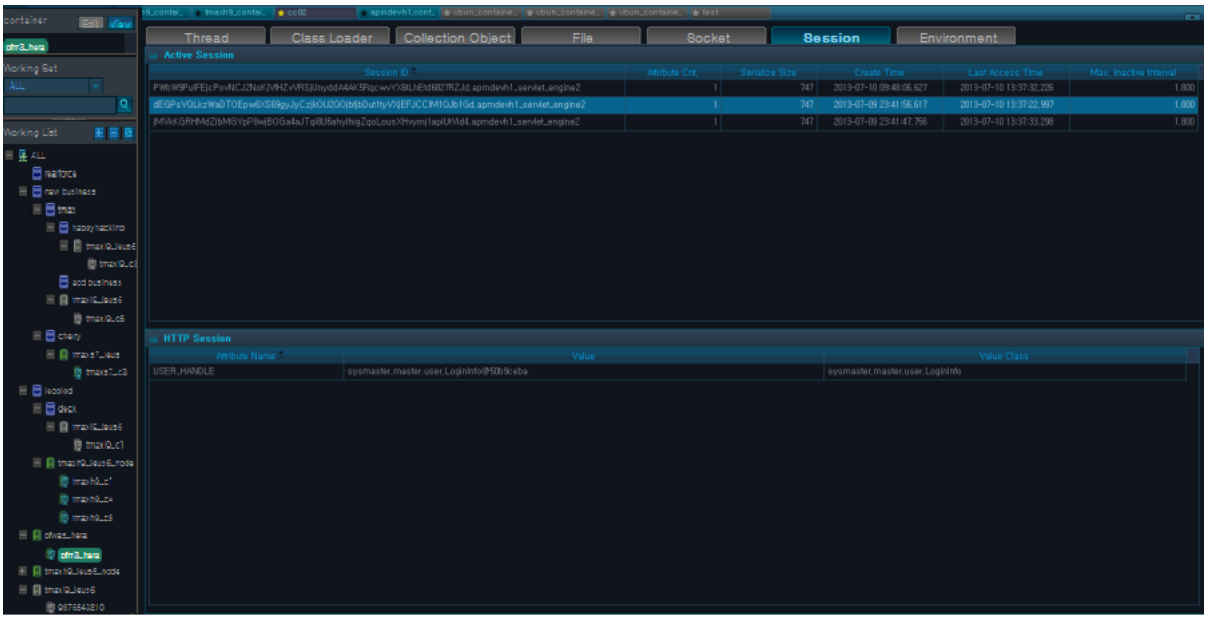


Property	Description
Host IP	Host IP Address.
Remote Port	Remote port number.
Local Port	Local port number.
Start Time	Socket start date and time.
Read Cnt.	Socket Read invocation count.
Write Cnt.	Socket Write invocation count.
In Stack	Enable In Stack?
Out Stack	Enable Out Stack?

3.3.6. Session

Session displays a list of sessions started in the container and their properties. When a row is selected from the Active Session List, the selected session's properties are displayed in the HTTP Session table below.

[Figure 3.16] Real-Time Analysis - Snapshot - Session



- **Active Session**

The following is description of the table properties.

Property	Description
Session ID	ID of HTTP session object.
Attribute Cnt.	Number of attributes of the session.
Serialize Size	Data size.
Create Time	Time when HTTP session object is created.
Last Access Time	Last time when HTTP session's properties were accessed.
Max. Inactive Interval	Expiration time for HTTP session object that is maintained but not accessed by the container.

- **HTTP Session**

The following is description of the table properties.

Property	Description
Attribute Name	Attribute name of the session.

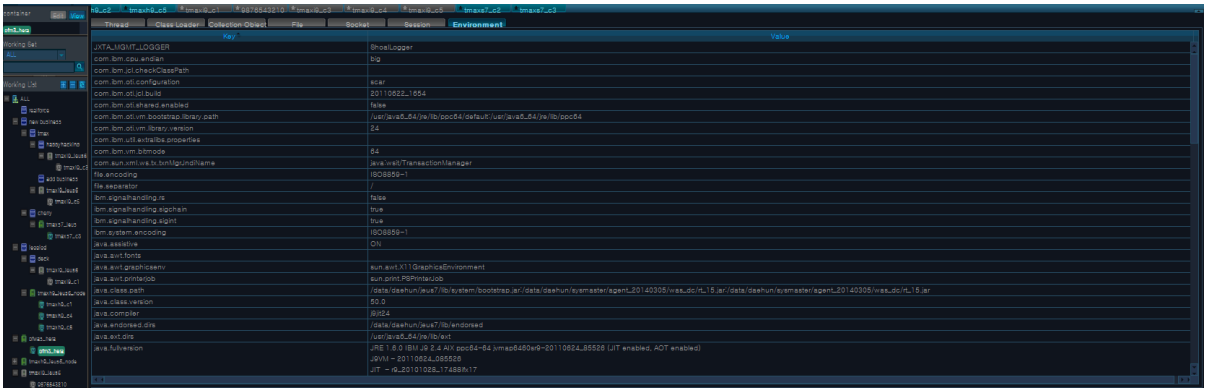
Property	Description
Value	Session value.
Session Class	Class information of the session.

3.3.7. Environment Variable

Environment Variable displays information about the environment variables that are used by the container. All JVM environment variables and container environment variables can be viewed without any separate configurations.

The following is the Environment Variable screen.

[Figure 3.17] Real-Time Analysis - Snapshot - Environment Variable



3.4. Event

Event displays a list of unchecked events by event type (INFO, WARNING, CRITICAL, or FATAL) for viewing and analysis.

Event can be accessed from **[WAS] > [Real-Time Analysis] > [Event]** and consists of the following tabs.

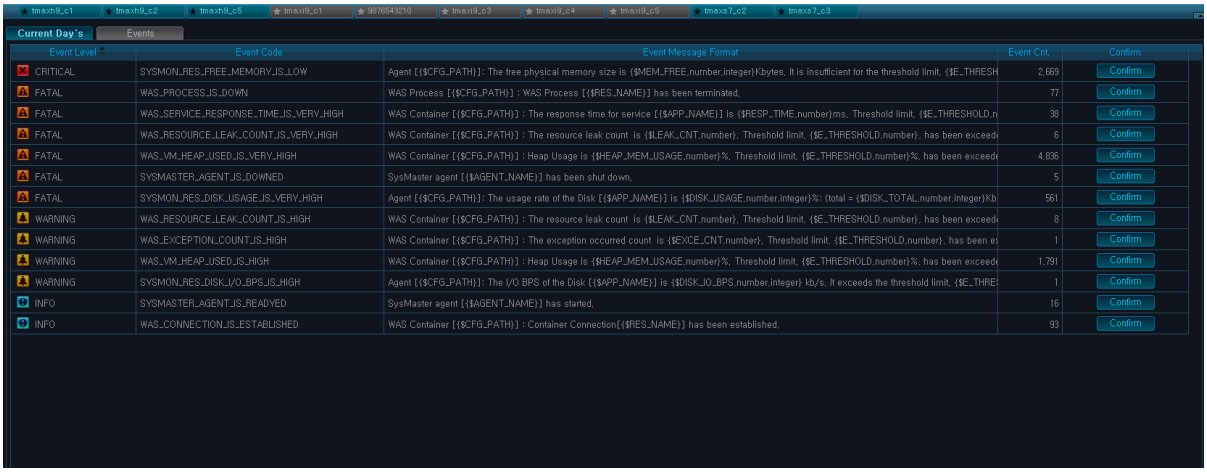
- **[Current Day's Event Status]**
- **[Events]**

Event threshold can be modified from **[ADMIN] > [Event] > [Threshold Settings]**. For more information about threshold settings, refer to "SysMaster Administrator Guide".

3.4.1. Current Day's Event Status

Current Day's Event Status displays a list of unconfirmed events that occurred on the current day between 0:00 to 24:00.

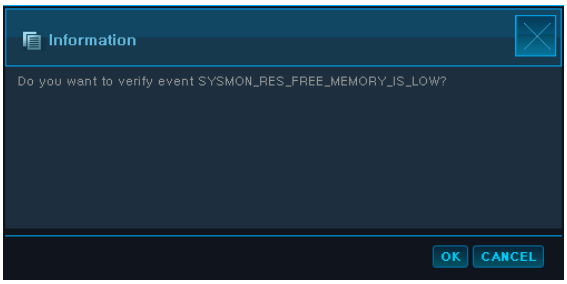
[Figure 3.18] Real-Time Analysis - Event - Current Day's Event Status



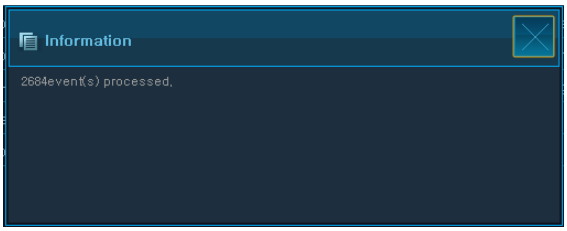
The following is description of the Current Day's Event Status table properties.

Property	Description
Event Level	Event level. (INFO, WARNING, CRITICAL, or FATAL)
Event Code	Event code.
Event Message Format	Event message format.
Event Cnt.	Number of event occurrences.
Confirm	Mark the event as being checked.

[Confirm] is used to mark the event as being checked.



When an event is marked as being checked, it will be removed from the list.

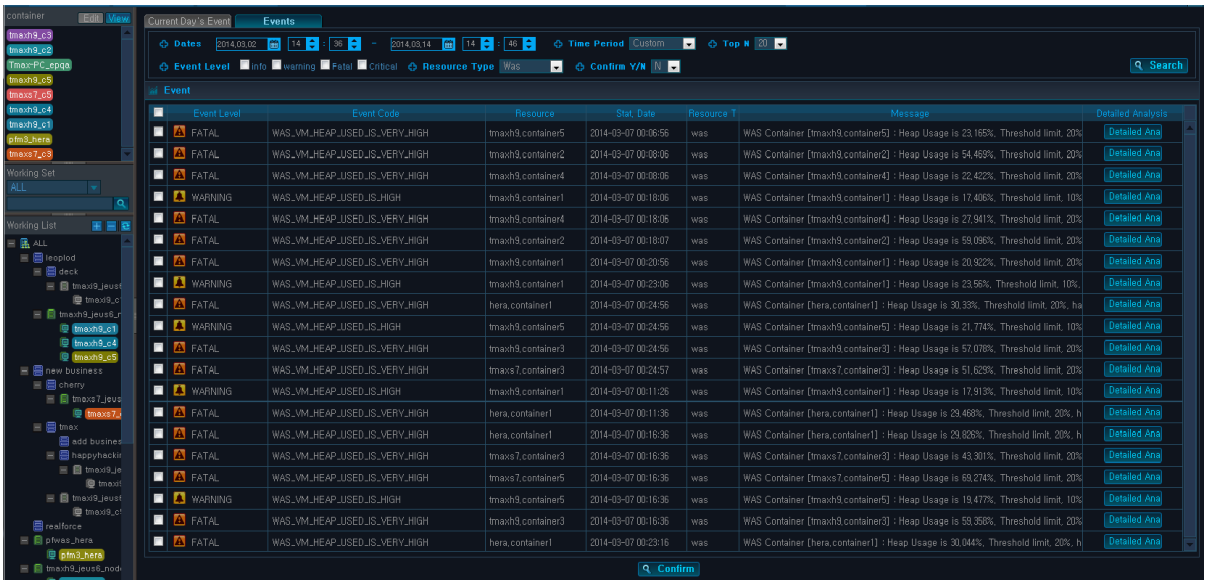


If the confirmed event reoccurs, event count will be reset at 1.

3.4.2. Events

Events display events that match the search criteria.

[Figure 3.19] Real-Time Analysis - Event - Event List



- **Search Conditions**

  The following is description of search criteria properties. Enter the criteria, and then click **[Search]** to display the data.

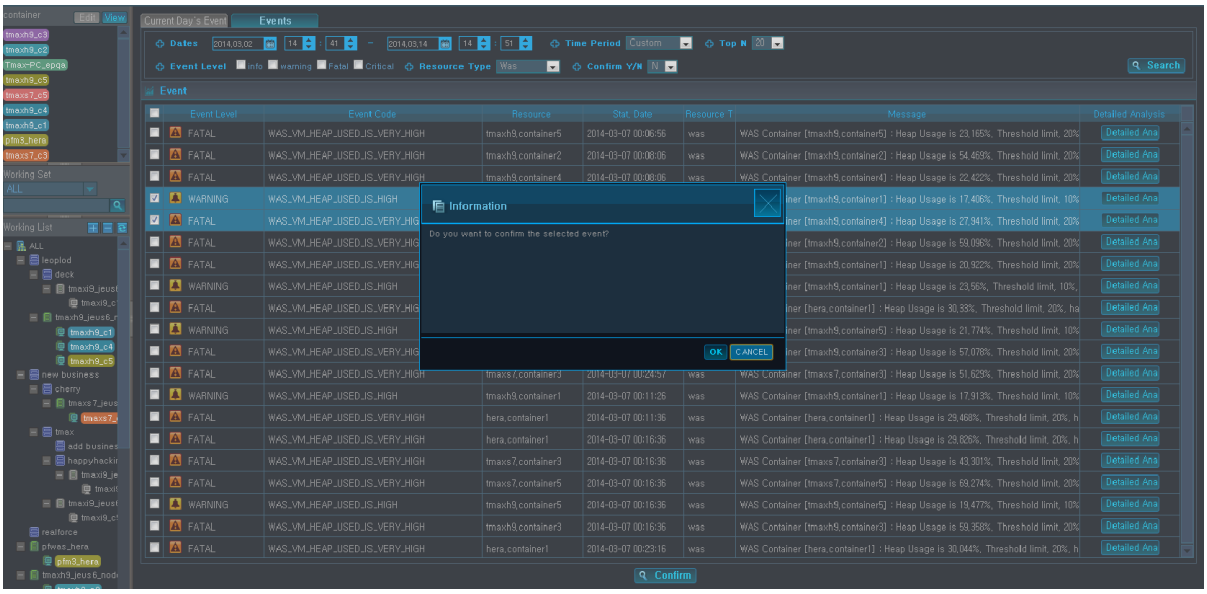
Property	Description
Dates	Desired time period.
Time Period	Select one from Last 10 Min, 1 Hr, or 1 Day.
Top N	Number of rows to display in the Event table.
Event Level	Event level.
Resource Type	Resource type. (Was, System)
Confirm Y/N	Confirm the event. (All, Y, N)

- **Event Table**

  The following is description of the Event table properties.

Property	Description
Event Level	Event level. (INFO, WARNING, CRITICAL, FATAL)
Event Code	Event code.
Resource	Resource name.
Start Date	Date and time of event occurrence.
Resource Type	Resource type (Was, System).
Message	Event message.
Detailed Analysis	Detailed analysis of the event.

To confirm an event, check the checkbox in the first column, and then click **[Confirm]** at the bottom of the screen. To select all events, check the checkbox in the first column of the header.



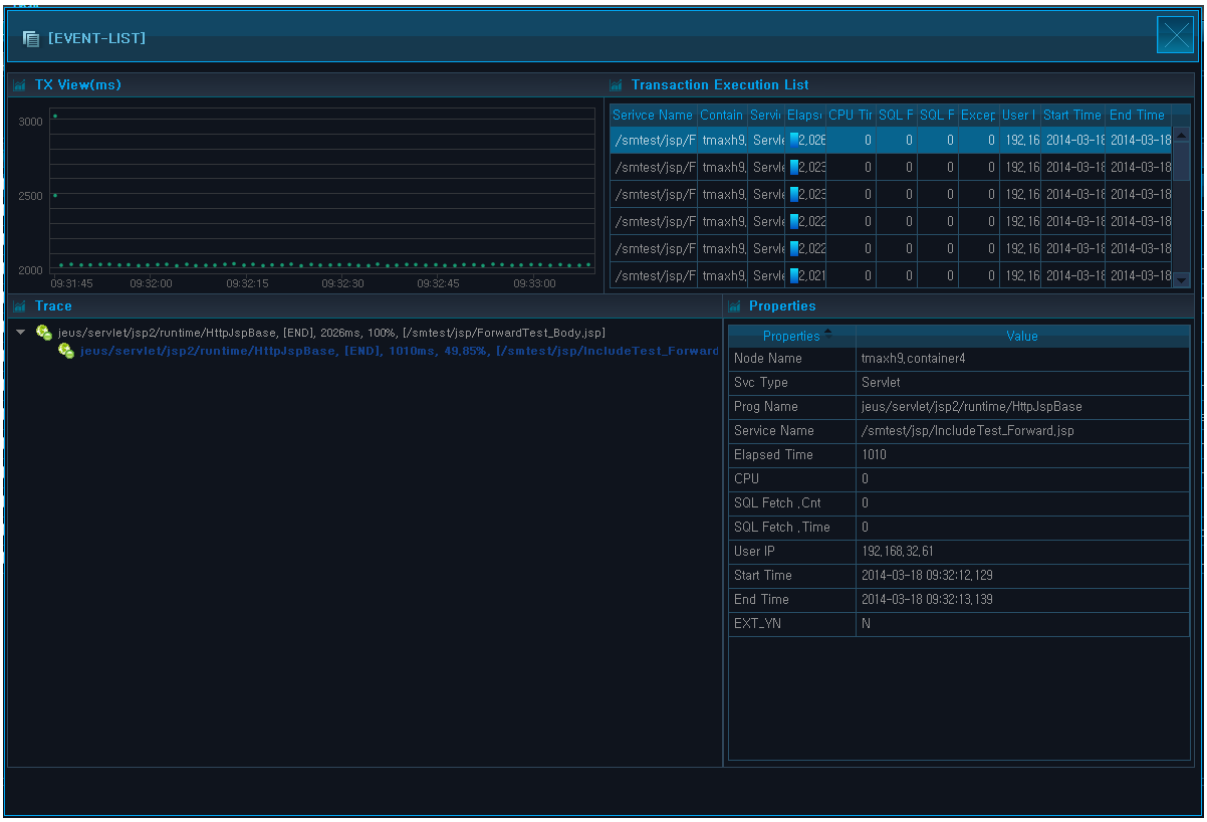
Selected events can be analyzed in detail. Using the mouse, hover over the event to view the event message in a balloon help. Click **[Detailed Analysis]** to go to the Detailed Analysis screen.

The following is description of the properties displayed for each event.

Event	Component
SysMon Event	[Host CPU Usage(%), Host Memory Usage(mbyte), Swap Memory Usage(mbyte), Disk I/O(bps)] Line Chart
Vm Event	[JVM CPU Usage(%), JVM Memory Usage(mbyte), GC Time(s), Available Heap Size(mbyte)] Line Chart

Event	Component
Summary Event	[TPS, Avg. Response Time(s), Number of Concurrent Users, Avg. Execution Count] Line Chart
Service Event	TX View, [Transaction Execution List, Property] Table, Trace
Resource Event	[Resource Avg. Response Time (s), Number of Unclaimed Resources, Leak] Line Chart, Service Table.
Pool Event	[Thread Pool Use Count, DB Pool Use Count, Pool Use Count] Line Chart, Pool List Table.

[Figure 3.20] Detailed Event Analysis Screen



Chapter 4. Analysis

This chapter describes the **Detailed Analysis** screen.

4.1. Overview

Analysis screen queries and analyzes past data of servers and WASs that are registered in SysMaster.

Analysis can be accessed from **[WAS] > [Analysis]**.

[Figure 4.1] Main WAS Analysis Screen

Analysis Menu consists of the following two items.

- **Working List**

  Multiple containers can be selected from the Working List. For detailed information, refer to "1.4. Working List".

- **Analysis**

  Data is displayed in charts and using a summary table by container for the following menus.

Menu Item	Description
[Summary]	Displays JVM data, throughput, user data, service execution data, and error event charts for the selected time period.
[TX View]	Displays current transaction's distribution over the selected time period.
[Service]	Displays service, SQL, exception, and external transaction data for the selected time period.
[Infra]	Displays JVM, java pool, unclaimed resource, JNDI, and host data for the selected time period.
[Event]	Displays event occurrence status, list, and trends for the selected time period.
[Visitor]	Displays user related charts for the selected time period.

Search Condition

Analysis Menu uses a common time period search condition to retrieve data. By default, all screens of Analysis Menu display data for the last 10 minutes.

The following is the common search condition input section.

[Figure 4.2] Common Search Condition

The search condition can be set by entering the date and time fields of **'Dates'** or by selecting an option from the **'Time Period'** dropdown list.

By default, **'Time Period'** is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month." TX View is provided for only last 1 day. When an option is selected, the **'Dates'** fields are automatically filled in using the current time as the start time. After setting the search condition, click **[Search]**.

4.2. Summary

Summary displays charts for **JVM data**, **throughput**, **user data**, **service execution data**, and **error event occurrence count** of the selected containers. Click on any value on the chart to move to the relevant Analysis screen. Summary screen, by default, displays data for the last 10 minutes.

Summary can be accessed from **[WAS] > [Analysis] > [Summary]**.

[Figure 4.3] Analysis - Summary

- **Search Condition**

  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, 'Time Period' is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."

- **Working List**

  The charts display data for the selected containers in the Working List.

Chart	Description
TPS	Transactions per second for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Transactions Per Second)
Avg. Response Time(s)	Average service response time for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Avg. Response Time(s))
Concurrent User Count	Number of concurrent users per container.

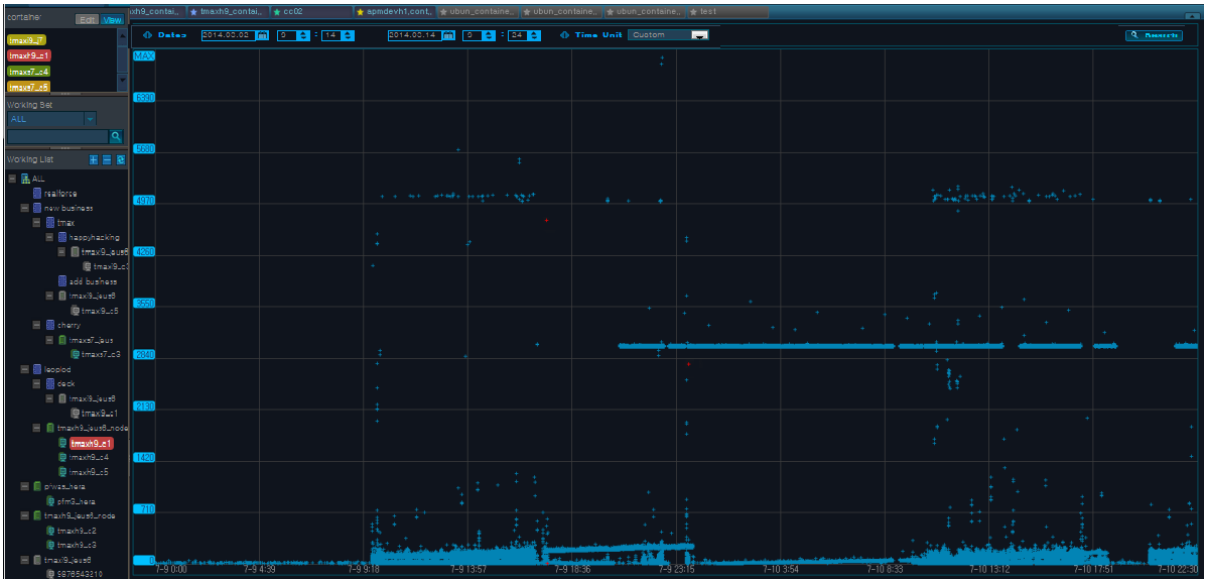
Chart	Description
	Since HTTP protocol does not maintain connections with users, the following equation based on the performance theory is used to determine the number of concurrent users. `ConcurrentUser = Throughput(tps) * {Resp.Time(sec) + ThinkTime(sec)}` (X axis: Selected Time Period, Y axis: Number of Concurrent Users)
Avg. Active Service Count	Average number of active services for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Active Service Count)
Service Execution Count	Number of service executions for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Service Execution Count)
Error Event	Number of error event occurrences for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Error Event Count)
JVM CPU Usage (%)	JVM CPU Usage for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: JVM CPU Usage(%))
JVM Memory Usage (mbyte)	JVM memory usage for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: JVM Memory Usage (MB))
GC Time (s)	Time spent in Garbage Collection for the selected container(s) in Working List. (X axis: Selected Time Period, Y axis: GC Time(s))

4.3. TX View

Based on the search condition, **TX View** displays transactions processed per unit of time (ms) using scatter plot to show distribution of the transaction over multiple containers.

TX View can be accessed from **[WAS] > [Analysis] > [TX View]**.

[Figure 4.4] Analysis - TX View



- **Search Condition**

  Set the following search condition, and then click **[Search]**.

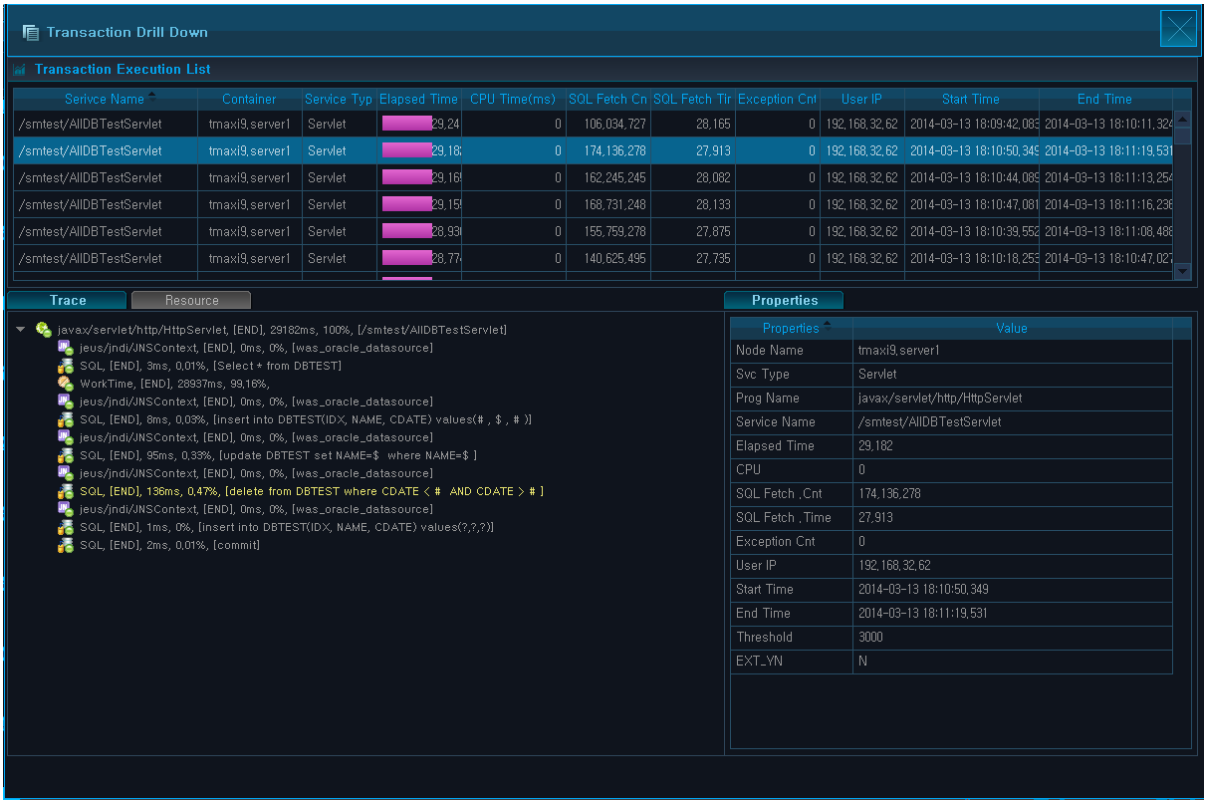
Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, **'Time Period'** is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."

- **TX View**

  Y axis shows the Elapsed Time(ms). When a Y axis value is clicked, data is displayed with the selected value as the max Y axis value. TX View displays data in 3 different colors. Normal transaction is in blue, resource leak is in yellow, and exception is in red.

  Use Drag & Drop method on a desired area to display detailed data.

[Figure 4.5] TX View Drill Down Screen



For detailed information about TX View, refer to "TX View" in "2.4. Real-Time Dashboard".

4.4. Service

Service displays data related to service, SQL, exception, and external transaction for one or more selected containers.

Service can be accessed from **[WAS] > [Analysis] > [Service]** and consists of the following tabs.

- **[Top N]**
- **[Service]**
- **[SQL]**
- **[Exception]**
- **[External Transaction]**

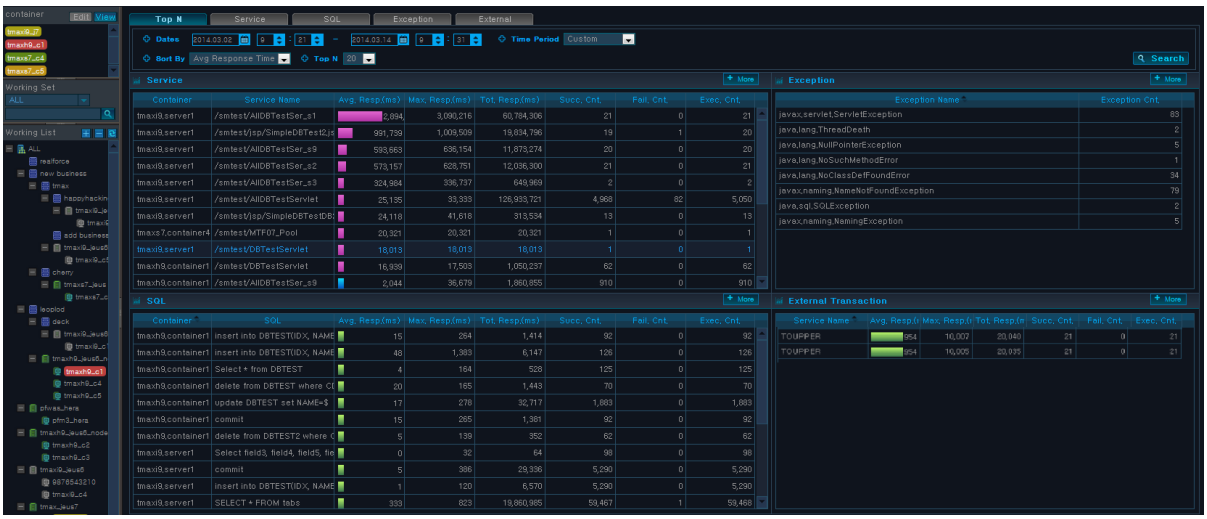
4.4.1. Top N

Top N displays a sorted table of currently active services, SQLs, exceptions, and external transactions for each container.

Select a service row to view the service trace and properties. Since too many transactions can be displayed with a search condition that results in transaction drill-down, the maximum time period search condition is a day.

Click **[+ More]** from each table to move to the related tab to see more detailed information.

[Figure 4.6] Analysis - Service - Top N



- **Search Condition**

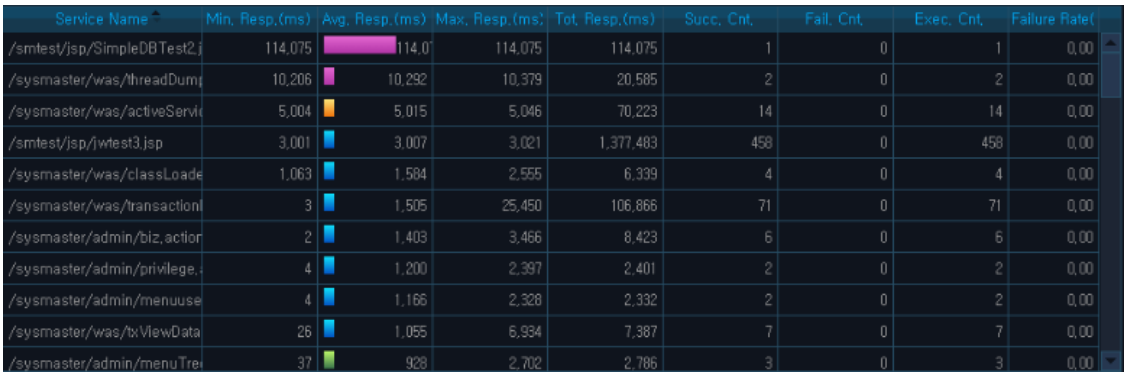
  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, **'Time Period'** is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."
Sort By	Data is displayed in a table sorted in descending order of a sort item (Avg Response Time, Success Cnt, Fail Cnt). (Note that the Exception Table is not affected by the sort criteria)

Service

Displays service execution data. Select a service row to view its trace data and properties.

[Figure 4.7] Analysis - Service - Top N - Service

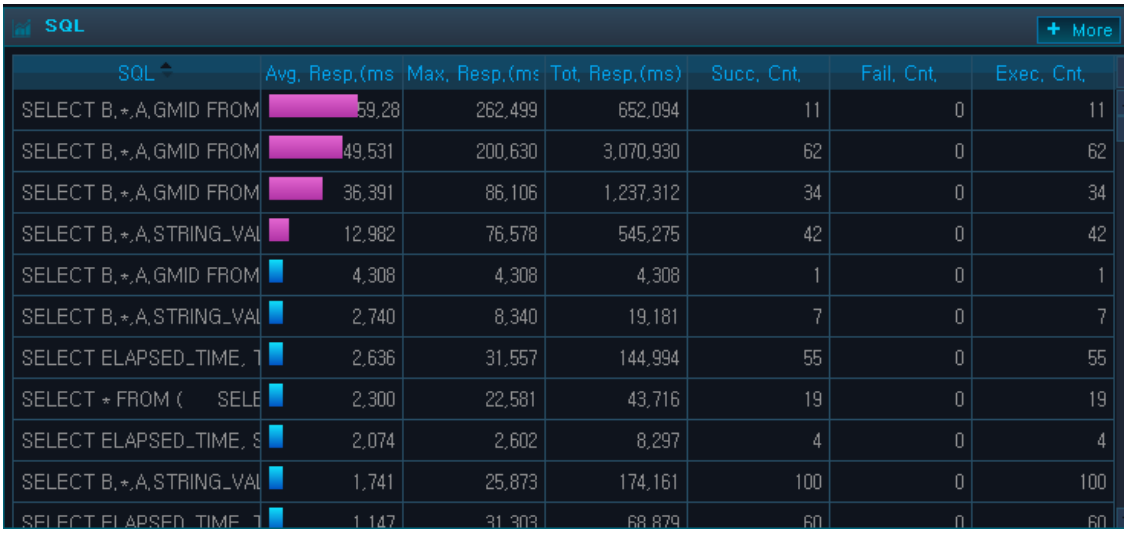


Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Avg. Resp.(ms)	Average service response time.
Max. Resp.(ms)	Max Service response time.
Tot. Resp.(ms)	Total service response time.
Succ. Cnt.	Number of successful executions of the service.
Fail. Cnt.	Number of failed executions of the service.
Exec. Cnt.	Number of service executions.

SQL

Displays SQL execution list when service is executed.

[Figure 4.8] Analysis - Service - Top N - SQL

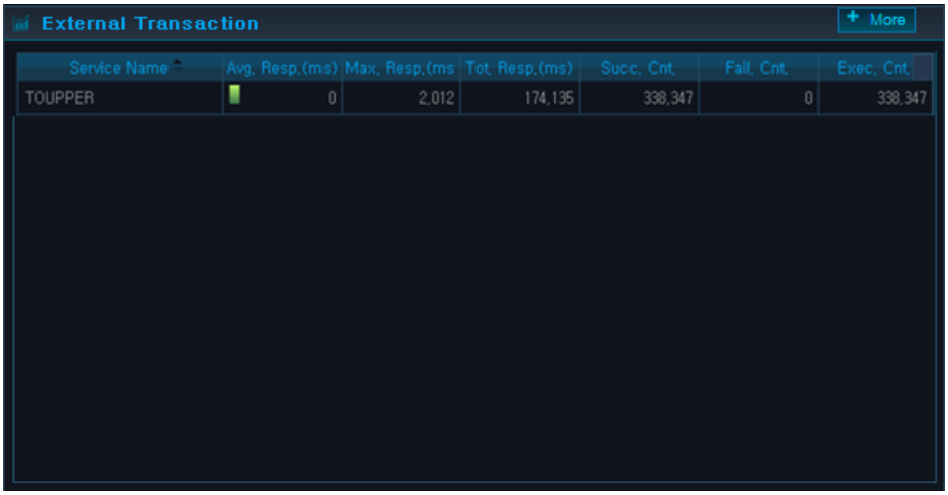


Property	Description
SQL	Currently executing SQL.
Avg. Resp.(ms)	Average SQL response time.
Max. Resp.(ms)	Max SQL response time.
Tot. Resp.(ms)	Total SQL response time.
Succ. Cnt.	Number of successful executions of the SQL.
Fail. Cnt.	Number of failed executions of the SQL.
Exec. Cnt.	Number of SQL executions.

External Transaction

Displays external transaction data that is received during TP.

[Figure 4.9] Analysis - Service - Top N - External Transaction

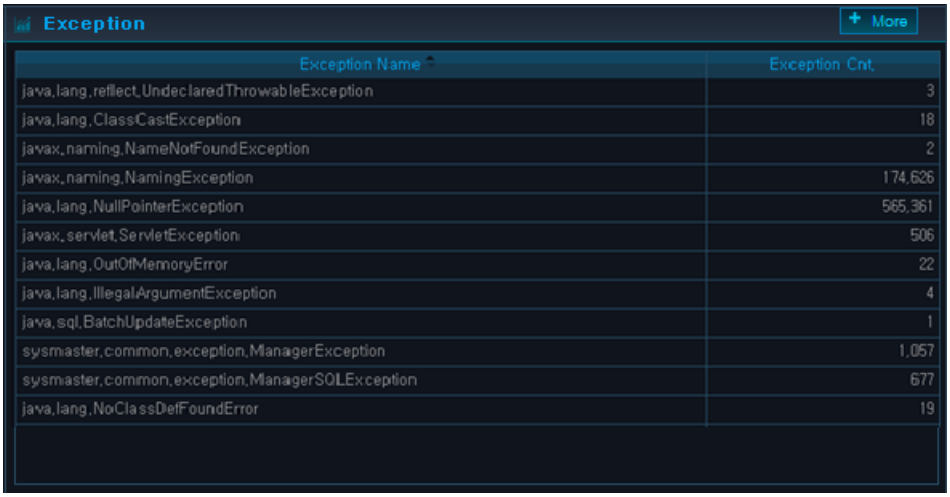


Property	Description
Service Name	Service name.
Avg. Resp.(ms)	Average service response time.
Max. Resp.(ms)	Max service response time.
Tot. Resp.(ms)	Total service response time.
Succ. Cnt.	Number of successful executions of the service.
Fail. Cnt.	Number of failed executions of the service.
Exec. Cnt.	Number of service executions.

Exception

Displays a list of Java EE exception types (SQLException, NullPointException, ServletException, SocketException, FileIOException, etc.) and their number of occurrences (Note that only the exceptions that are thrown are handled here).

[Figure 4.10] Analysis - Service - Top N - Exception

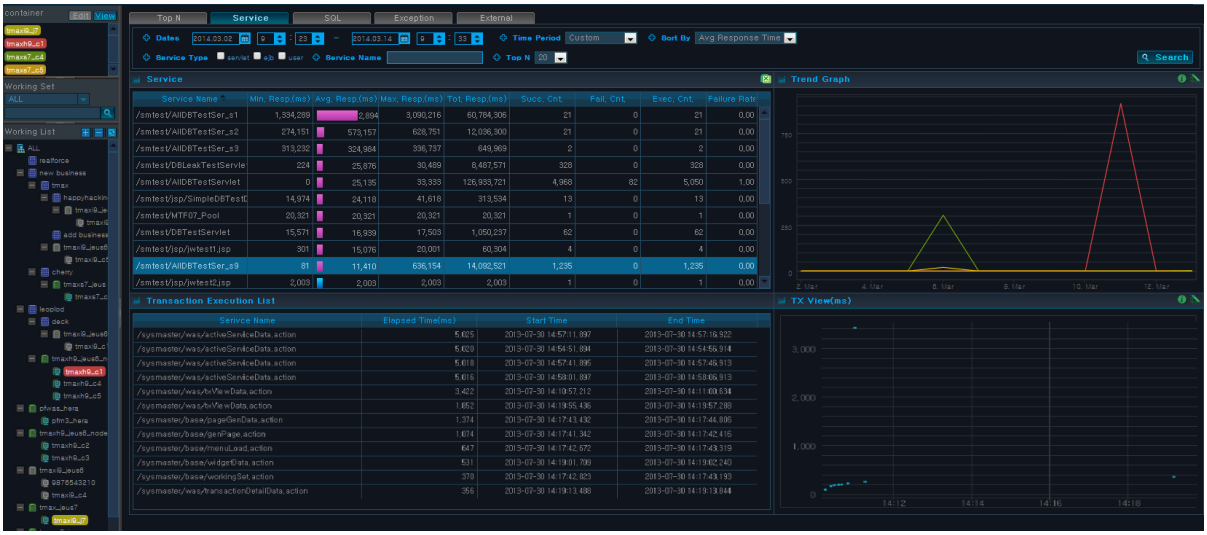


Property	Description
Exception Name	Exception Name.
Exception Cnt.	Number of exception occurrences.

4.4.2. Service

Service displays service history of one or more selected containers, and Trend Graph for the services. When a value is selected from the Trend Graph, Transaction Execution List and TX View(ms) for the selected time period is displayed.

[Figure 4.11] Analysis - Service - Service



- **Search Condition**

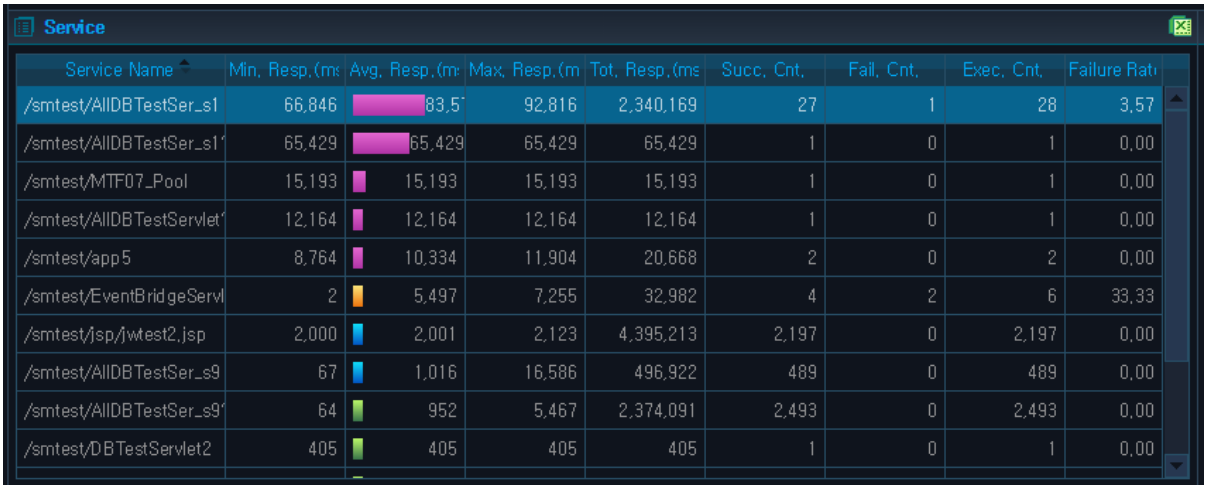
Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, **'Time Period'** is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."
Sort By	Data is displayed in a table sorted in descending order of a sort item (Avg Response Time, Success Cnt, Fail Cnt).
Service Type	Select one of servlet, ejb, or user property.
Service Name	Service name to search for. Finds all services with all or part of the search text.
Top N	Number of rows to display in each table. Select one of 20, 50, 100, 300, or all.

Service Table

The following is description of the Service Table properties.

[Figure 4.12] Analysis - Service - Service - Service Table



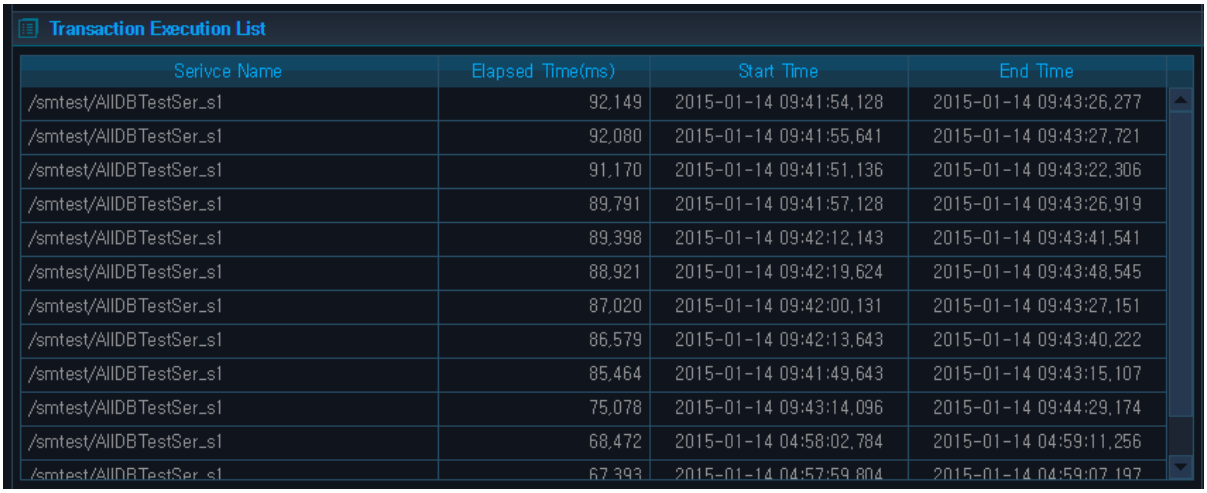
Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Min. Resp.(ms)	Min service processing time.
Avg. Resp.(ms)	Average service response time.
Max. Resp.(ms)	Max service processing time.
Tot. Resp.(ms)	Total service processing time.
Succ. Cnt.	Number of successful executions of the service.
Fail. Cnt.	Number of failed executions of the service.
Exec. Cnt.	Number of service executions.
Failure Rate(%)	Failure rate of the requested service.

Transaction Execution List

When a row is selected from the Service Table, related Trend Graph is displayed. When a time is selected from the Trend Graph, Transaction Execution List is displayed for the selected time.

The following is description of Transaction Execution List Table properties. When a table row is selected, a popup window with drill-down Transaction Execution List is displayed.

[Figure 4.13] Analysis - Service - Service - Transaction Execution List

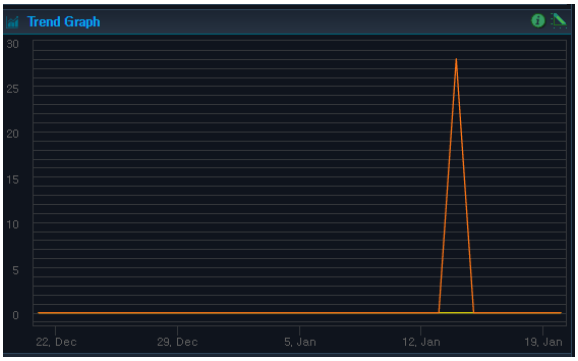


Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Elapsed Time(ms)	Duration of service execution.
Start Time	Service start date and time.
End Time	Service termination date and time.

Trend Graph

Analyzes service trends of the selected containers in the Working List. X axis shows date and time of the search period, and the Y axis shows the number of successfully processed services.

[Figure 4.14] Analysis - Service - Service - Trend Graph

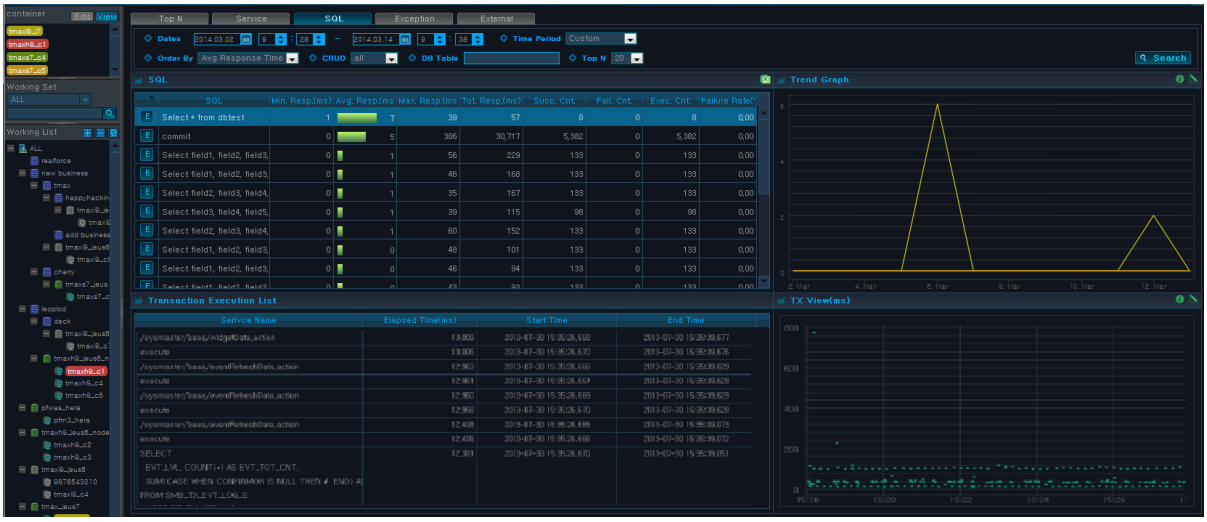


4.4.3. SQL

SQL displays SQL queries of one or more selected containers and Trend Graph and Transaction Execution List for the related services.

When a value is selected from the Trend Graph, Transaction Execution List and TX View(ms) for the selected time period is displayed.

[Figure 4.15] Analysis - Service - SQL



- **Search Condition**

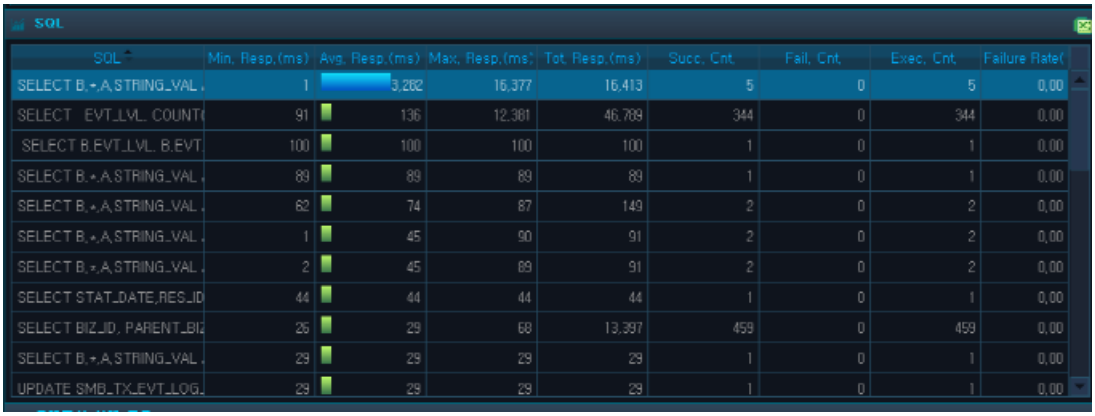
  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, **'Time Period'** is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."
Sort By	Data is displayed in a table sorted in descending order of a sort item (Avg Response Time, Success Cnt, Fail Cnt).
CRUD	Select one of CRUD properties (select, insert, delete, update). Searches for queries using the selected CRUD property.
DB Table	Table name to search for. Finds all tables with all or part of the search text.
Top N	Number of rows to display in each table. Select one of 20, 50, 100, 300, or all.

SQL Table

The following is description of the SQL Table properties.

[Figure 4.16] Analysis - Service - SQL - SQL Table



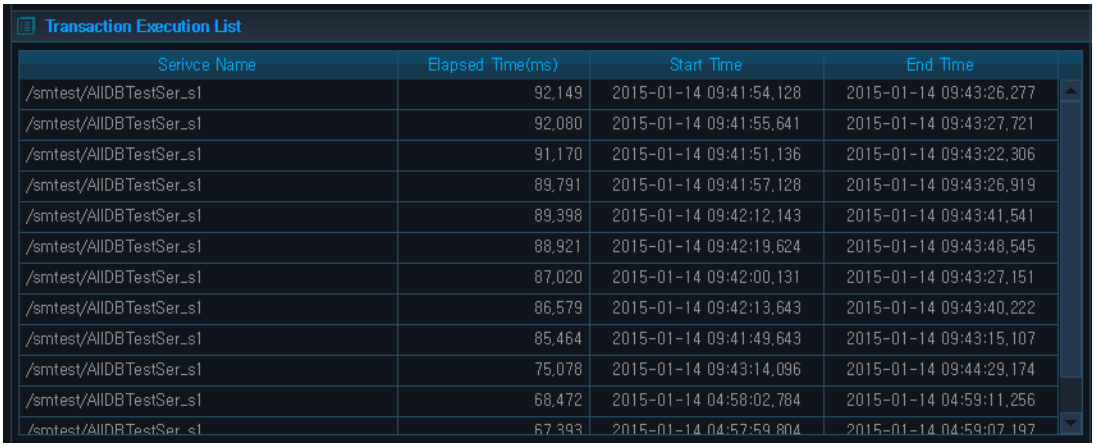
Property	Description
SQL	Currently executing SQL.
Min. Resp.(ms)	Min service processing time.
Avg. Resp.(ms)	Average service response time.
Max. Resp.(ms)	Max service processing time.
Tot. Resp.(ms)	Total service processing time.
Succ. Cnt.	Number of successful executions of the SQL.
Fail. Cnt.	Number of failed executions of the SQL.
Exec. Cnt.	Number of service executions.
Failure Rate(%)	Failure rate of the requested service.

Transaction Execution List Table

When a row is selected from the SQL Table, Trend Graph and Transaction Execution List is displayed.

The following is description of the Transaction Execution List Table properties. When a table row is selected, a popup window with drill-down Transaction Execution List is displayed.

[Figure 4.17] Analysis - Service - SQL - Transaction Execution List Table

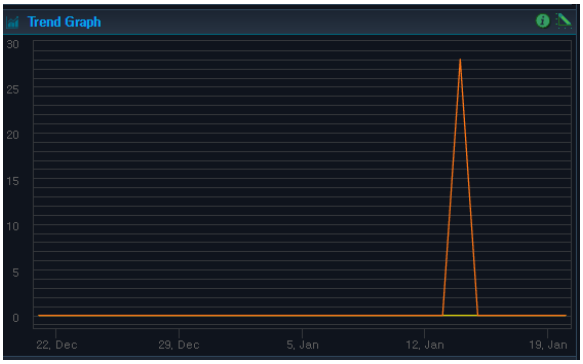


Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Elapsed Time(ms)	Duration of service execution.
Start Time	Service start date and time.
End Time	Service termination date and time.

Trend Graph

Analyzes service trends of the selected containers in the Working List. X axis shows date and time of the search period, and the Y axis shows the number of successfully processed services.

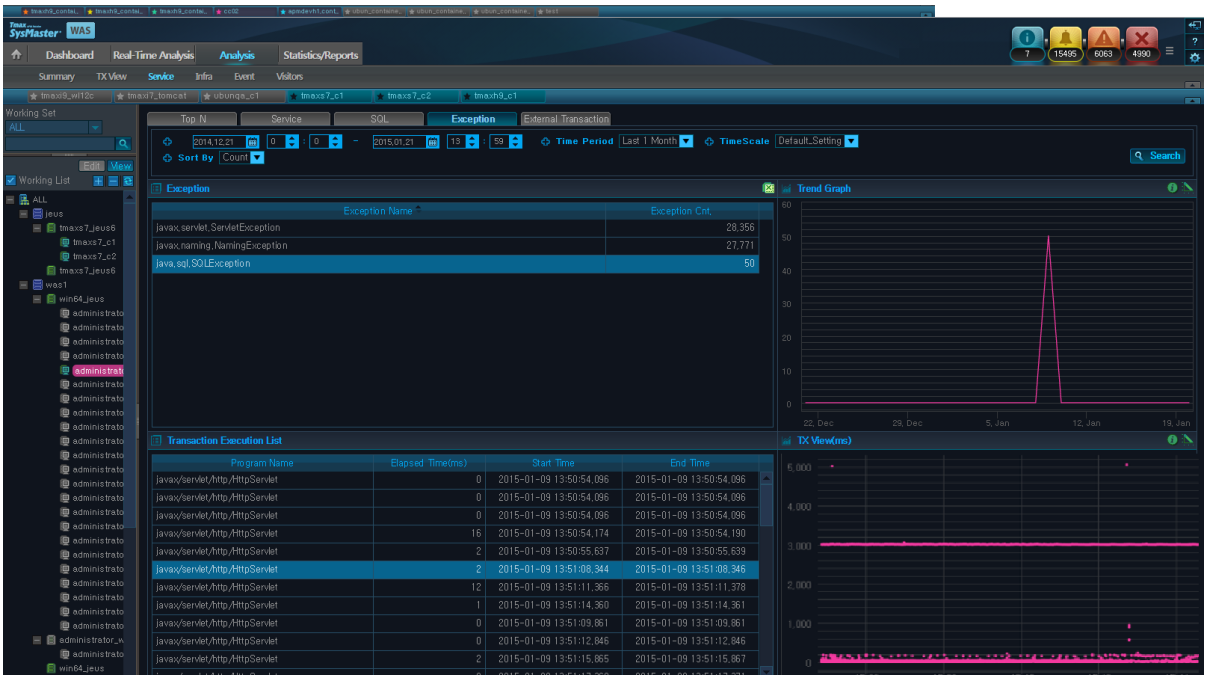
[Figure 4.18] Analysis - Service - SQL - Trend Graph



4.4.4. Exception

Exception displays exception data of one or more selected containers and Trend Graph for the related services. When a value is selected on the Trend Graph, Transaction Execution List and TX View(ms) for the selected time period is displayed.

[Figure 4.19] Analysis - Service - Exception



- **Search Condition**

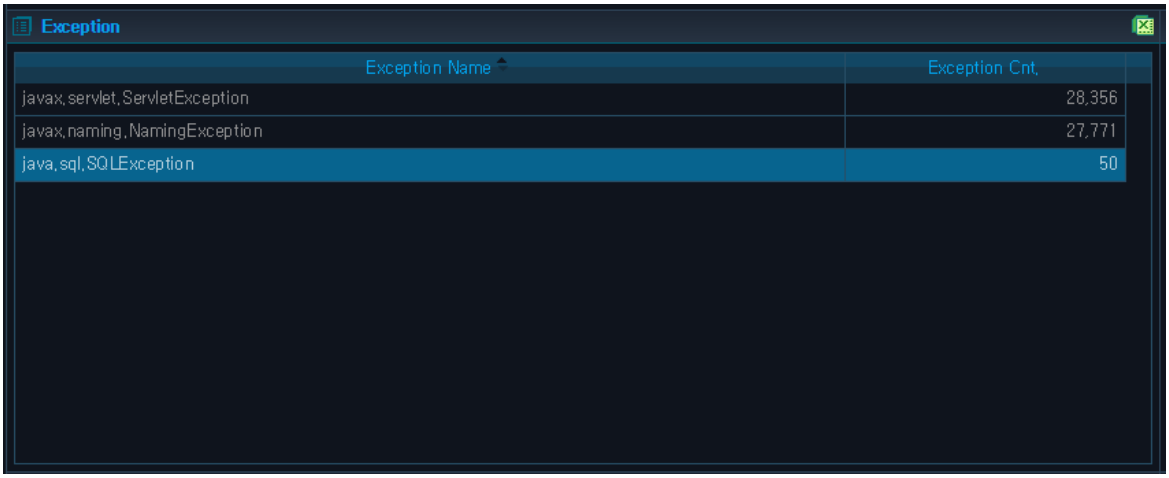
  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**.' By default, 'Time Period' is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."
Sort By	Data is displayed in a table sorted in descending order of a sort item (Count).

Exception Table

The following is description of the Exception Table properties.

[Figure 4.20] Analysis - Service - Exception - Exception Table



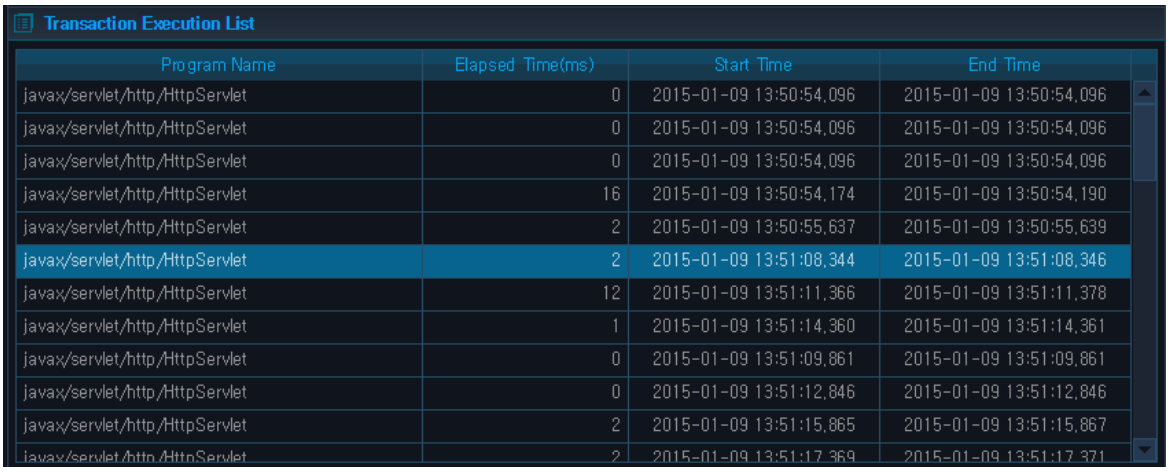
Property	Description
Exception Name	Exception name.
Exception Cnt.	Number of exception occurrences.

Transaction Execution List

When a row is selected from the Exception Table, related Trend Graph and Transaction Execution List are displayed.

The following is description of the Transaction Execution List Table properties. When a table row is selected, a popup window with drill-down Transaction Execution List is displayed.

[Figure 4.21] Analysis - Service - Exception - Transaction Execution List

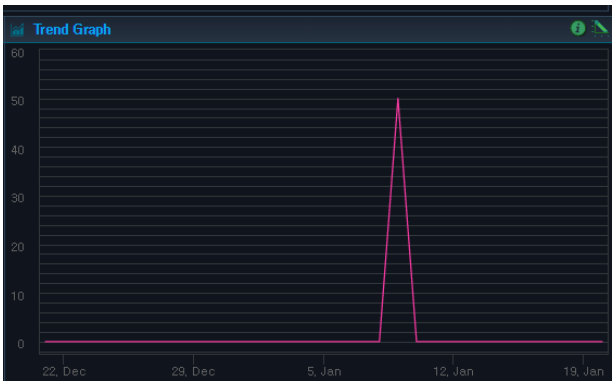


Property	Description
Program Name	Program name. (Name of a Servlet class, EJB class, etc.)
Elapsed Time(ms)	Duration of service execution.
Start Time	Service start date and time.
End Time	Service termination date and time.

Trend Graph

Analyzes service trends of the selected containers in the Working List. X axis shows date and time of the search period, and the Y axis shows the number of successfully processed services.

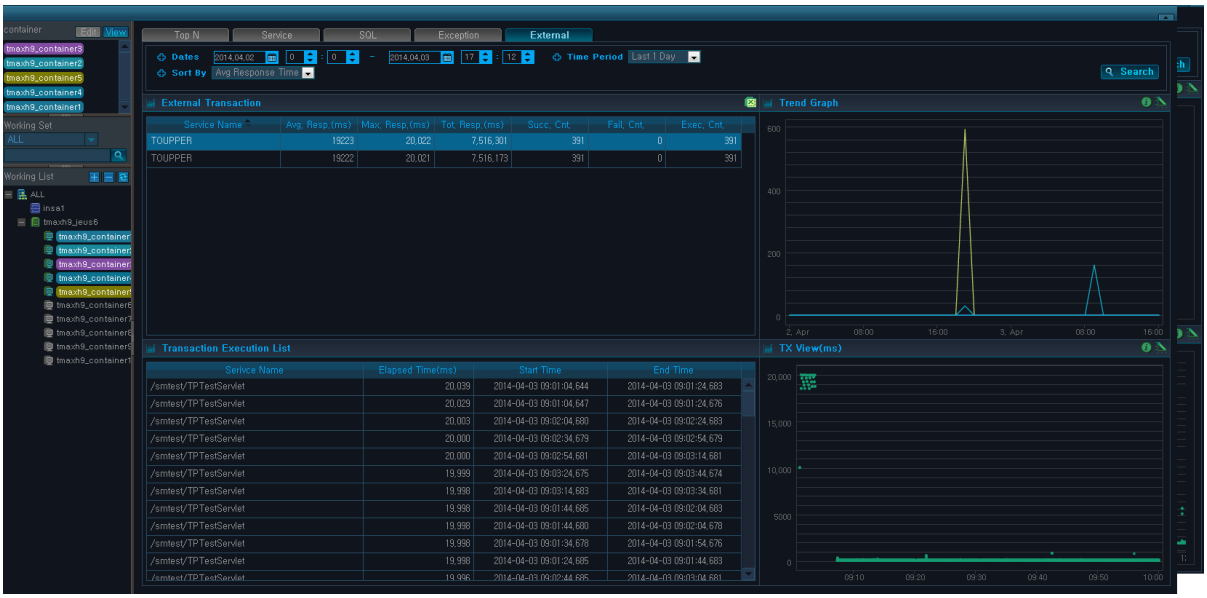
[Figure 4.22] Analysis - Service - Exception - Trend Graph



4.4.5. External Transaction

External Transaction displays external transaction data of one or more selected containers and Trend Graph for the related services. When a value is selected from the Trend Graph, Transaction Execution List and TX View(ms) for the selected time period is displayed.

[Figure 4.23] Analysis - Service - External Transaction



- **Search Condition**

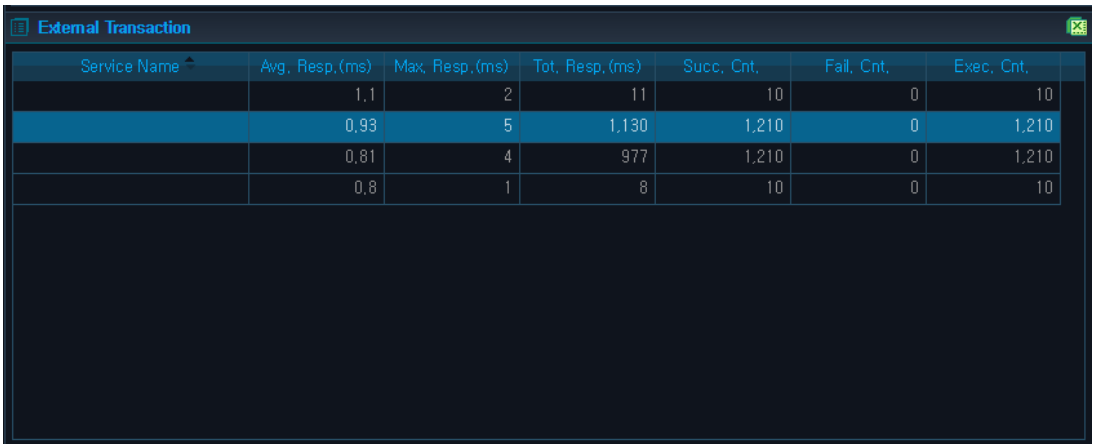
  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, **'Time Period'** is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."
Sort By	Data is displayed in a table sorted in descending order of a sort item (Avg Response Time, Success Cnt).

External Transaction Table

The following is description of the External Transaction Table properties.

[Figure 4.24] Analysis - Service - External Transaction - External Transaction Table



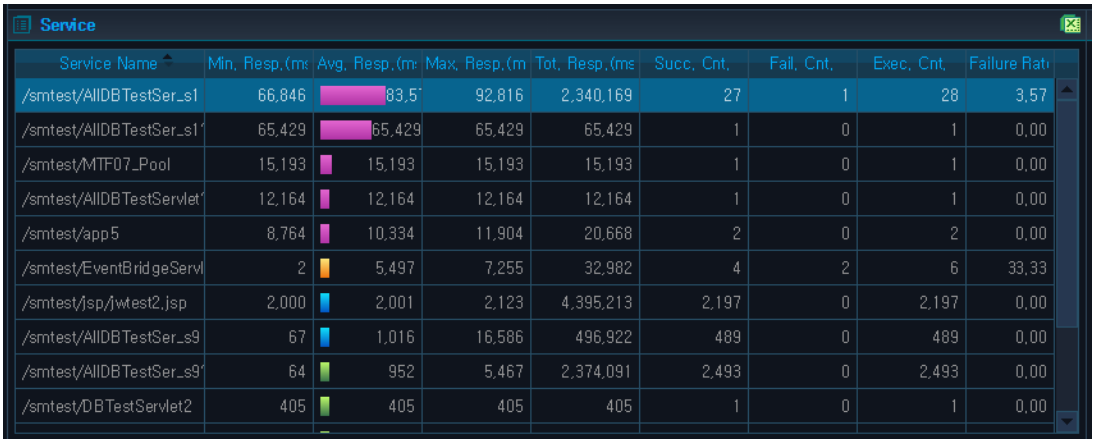
Property	Description
Service Name	Name of the service executed through an external transaction.
Avg. Resp.(ms)	Average response time of the service executed through an external transaction.
Max. Resp.(ms)	Max processing time of the service executed through an external transaction.
Tot. Resp.(ms)	Total processing time of the service executed through an external transaction.
Succ. Cnt.	Number of successful executions of the service executed through an external transaction.
Fail. Cnt.	Number of failed executions of the service executed through an external transaction.
Exec. Cnt.	Number of executions of the service executed through an external transaction.

Transaction Execution List Table

When a row is selected from the External Transaction Table, related Trend Graph and Transaction Execution List are displayed.

The following is description of the Transaction Execution List Table properties. When a table row is selected, a popup window with drill-down Transaction Execution List is displayed.

[Figure 4.25] Analysis - Service - External Transaction - Transaction Execution List Table



Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Elapsed Time(ms)	Duration of service execution.
Start Time	Service start date and time.
End Time	Service termination date and time.

Trend Graph

Analyzes service trends of the selected containers in the Working List. X axis shows date and time of the search period, and the Y axis shows the number of successfully processed services.

[Figure 4.26] Analysis - Service - External Transaction - Trend Graph

4.5. Infra

Infra displays data, related to resources and infra, detected at the time of the search.

Infra can be accessed from **[WAS] > [Analysis] > [Infra]** and consists of the following tabs.

- **[JVM]**
- **[Java Pool]**
- **[Unclaimed Resource]**
- **[JNDI]**
- **[Host]**

4.5.1. JVM

JVM displays JVM data, GC data, and heap data of one or more selected containers for the specified time period.

[Figure 4.27] Analysis - Infra - JVM

- **Search Condition**

  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, 'Time Period' is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."

- **Chart**

  The following is description of the chart properties.

Chart	Description
JVM CPU Usage(%)	JVM CPU usage of the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: JVM CPU Usage(%))
JVM Memory Usage(mbyte)	JVM memory usage of the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: JVM Memory Usage (MB))
GC Time(s)	Time spent in Garbage Collection by the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: GC Time(s))
GC Count	Number of times spent in Garbage Collection by the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: GC Count)
Available Heap Size(mbyte)	Available JVM heap memory size of the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Available Heap Size (MB))
Total Heap Size(mbyte)	Total JVM heap memory size of the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Available Heap Size (MB))

4.5.2. Java Pool

Java Pool displays information related to Java Pool data. Thread Pool and DB Pool data linked to WAS can be accessed from WAS status inquiry for Thread Pool and DB Pool in the units of a container.

[Figure 4.28] Analysis - Infra - Java Pool

- **Search Condition**

Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, 'Time Period' is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."
Pool Name	Pool name to search for. Finds all pool names with all or part of the search text.

- **Chart**

The following is description of the Java Pool chart properties.

Chart	Description
Thread Pool Use Count	Number of times thread pool was used by the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Thread Pool Use Count)

Chart	Description
DB Pool Use Count	Number of times DB pool was used by the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: DB Pool Use Count)
Use Count by Pool	Number of times each pool was used by the selected container(s) in the Working List. – active cnt : active pool count – current cnt : avg active + avg Idle – min : min pool size – max : max pool size (X axis: Selected Time Period, Y axis: Use Count by Pool)

- **Pool List**

  When a pool is selected from the Pool List, Use Count by Pool chart is displayed. The following is description of the Pool List properties.

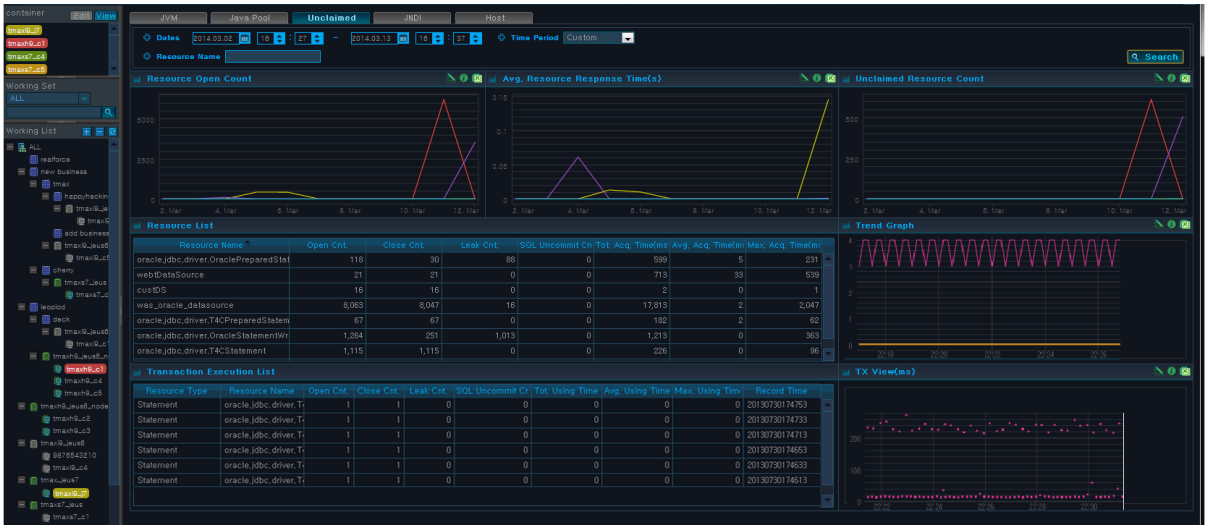
Property	Description
Pool Type	Pool type. (DB Pool or Thread Pool)
Pool Name	Pool name.
Avg. Active Cnt.	Average number of active threads.
Avg. Current Cnt.	Average number of current threads. (Avg. Active Cnt. + Avg. Idle Cnt.)
Min. Size	Min pool size.
Max. Size	Max pool size.

4.5.3. Unclaimed Resource

A resource refers to WAS system resource, including WAS-provided data source, file resource, etc., that is needed to execute a service. Resources are common property shared by applications in WAS, and they are important targets of management in terms of their acquisitions and returns. Resource list includes JDBC Connection (Pool), JDBC Connection (Data Source), JDBC Statement, TP Connection, etc.

Unclaimed Resource displays information related to unclaimed resources.

[Figure 4.29] Analysis - Infra - Unclaimed Resource



- **Search Condition**

  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, **'Time Period'** is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."
Resource Name	Resource name to search for. Finds all resources with all or part of the search text.

- **Chart**

  The following is description of the Unclaimed Resource chart properties.

Chart	Description
Resource Open Count	Number of times a resource was opened for use by the selected container(s) in the Working List. Uses Open Cnt value of the resource. (X axis: Selected Time Period, Y axis: Resource Open Count)
Avg. Resource Response Time(s)	Avg. resource response time for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Resource Avg. Response Time(s))
Unclaimed Resource Count	Number of unclaimed resources for the selected container(s) in the Working List.

Chart	Description
	Resource Leak Cnt is calculated by taking the difference between Open Cnt and Close Cnt. Leak Cnt is used as the unclaimed resource count. (X axis: Selected Time Period, Y axis: Unclaimed Resource Count)
Trend Graph	When a row is selected from the Resource List, Trend Graph of Unclaimed Resource Count for the selected container(s) in the Working List is displayed. Performs trend analysis of Unclaimed Resource Count by container. (X axis: Selected Time Period, Y axis: Unclaimed Resource Count)
TX View	When a value is selected from the Trend Graph, TX View(ms) for the selected time is displayed. (X axis: Time selected from Trend Graph, Y axis: Elapsed Time(ms))

- **Resource List**

The following is description of the Resource List properties.

Property	Description
Resource Name	Resource name.
Open Cnt.	Number of times resource was opened for use. (e.g.: JDBC Connection Open)
Close Cnt.	Number of times resource was returned.
Leak Cnt.	Leak count. (Open Cnt. - Close Cnt.)
SQL Uncommit Cnt.	Number of SQLs that have not been committed.
Tot. Using Time(ms)	Total time for securing the resource.
Avg. Using Time(ms)	Average time for securing the resource.
Max. Using Time(ms)	Max time for securing the resource.

- **Transaction Execution List**

The following is description of the Transaction Execution List properties.

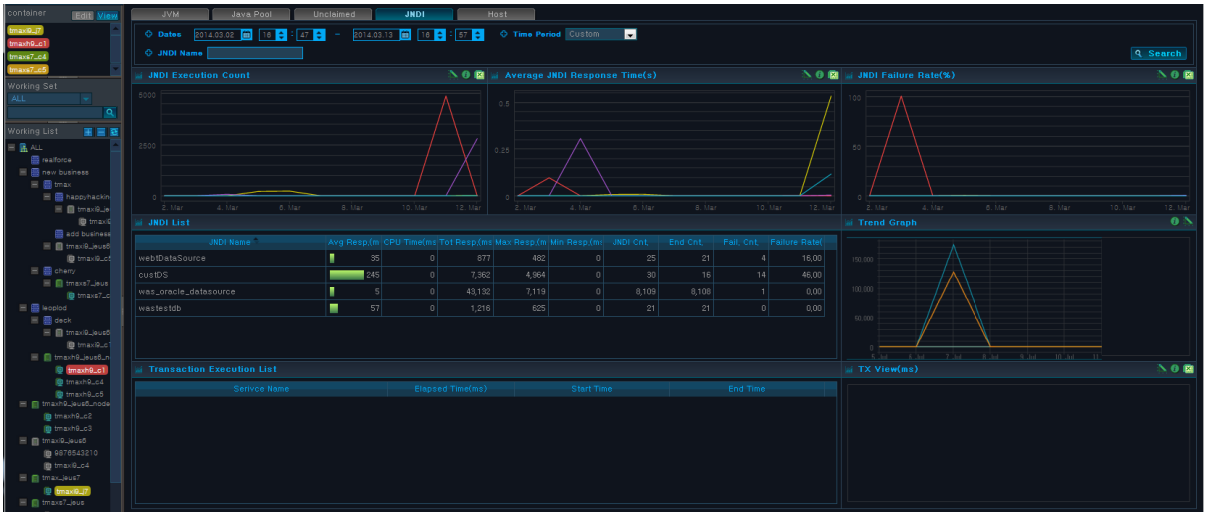
Property	Description
Resource Type	Resource type (WAS, System).
Resource Name	Resource name.

Property	Description
Open Cnt.	Number of times resource was opened for use. (e.g.: JDBC Connection Open)
Close Cnt.	Number of times resource was returned.
Leak Cnt.	Leak count. (Open Cnt. - Close Cnt.)
SQL Uncommit Cnt.	Number of SQLs that have not been committed.
Tot. Using Time(ms)	Total resource using time.
Avg. Using Time(ms)	Average resource using time.
Max. Using Time(ms)	Max resource using time.
Record Time	Time when resource acquisition is completed.

4.5.4. JNDI

JNDI displays JNDI data for the selected containers.

[Figure 4.30] Analysis - Infra - JNDI



- **Search Condition**

  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, 'Time Period' is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."
JNDI Name	JNDI name to search for. Finds all JNDI names with all or part of the search text.

- **Chart**

The following is description of the chart properties.

Chart	Description
JNDI Execution Count	Number of resources opened for use by the selected container(s) in the Working List. Uses resource's Open Cnt value. (X axis: Selected Time Period, Y axis: Resource Open Count)
Average JNDI Response Time(s)	Resource average response time for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: JNDI Avg. Response Time(s))
JNDI Failure Rate(%)	Number of unclaimed resources for the selected container(s) in the Working List. Resource Leak Cnt is calculated by taking the difference between Open Cnt and Close Cnt. Leak Cnt is used as the unclaimed resource count. (X axis: Selected Time Period, Y axis: Unclaimed Resource Count)
Trend Graph	When a row is selected from the Resource List, Trend Graph of Unclaimed Resource Count for the selected container(s) in the Working List is displayed Performs trend analysis of Unclaimed Resource Count by container. (X axis: Selected Time Period, Y axis: Unclaimed Resource Count)
TX View	When a value is selected from the Trend Graph, TX View(ms) for the selected time is displayed. (X axis: Time selected from Trend Graph, Y axis: Elapsed Time(ms))

- **JNDI List**

The following is description of the JNDI List properties.

Property	Description
JNDI Name	JNDI name.
Avg Resp.(ms)	JNDI average response time.
CPU Time(ms)	Average CPU time used by JNDI.

Property	Description
Tot Resp.(ms)	Total response time for invoking JNDI.
Max Resp.(ms)	Max response time for invoking JNDI.
Min Resp.(ms)	Min response time for invoking JNDI.
JNDI Cnt.	Number of JNDI requests.
End Cnt.	Number of completed JNDI requests.
Fail. Cnt.	Number of failed JNDI requests.
Failure Rate(%)	Percent of failed JNDI requests.

- **Trend Graph**

  When a JNDI row is selected from the JNDI List Table, related Trend Graph is displayed. Select a value on the Trend Graph to view the TX View(ms) Chart for the selected value.

- **Transaction Execution List**

  The following is description of the Transaction Execution List properties.

Property	Description
Service Name	Request name that identifies the service. (JSP URL, EJB Method, etc.)
Elapsed Time(ms)	Duration of service execution.
Start Time	Service start date and time.
End Time	Service termination date and time.

4.5.5. Host

Data for the system where WAS is installed can be accessed from **[User-defined System Dashboard]**. **Host** displays data of the host system of the containers or nodes selected in WAS component tree.

Host status data is collected in units of a container, and are displayed as a graph or container unit. For detailed information, refer to "2.6. User-defined System Dashboard".

[Figure 4.31] Analysis - Infra - Host

- **Search Condition**

  Set the following search condition, and then click **[Search]**.

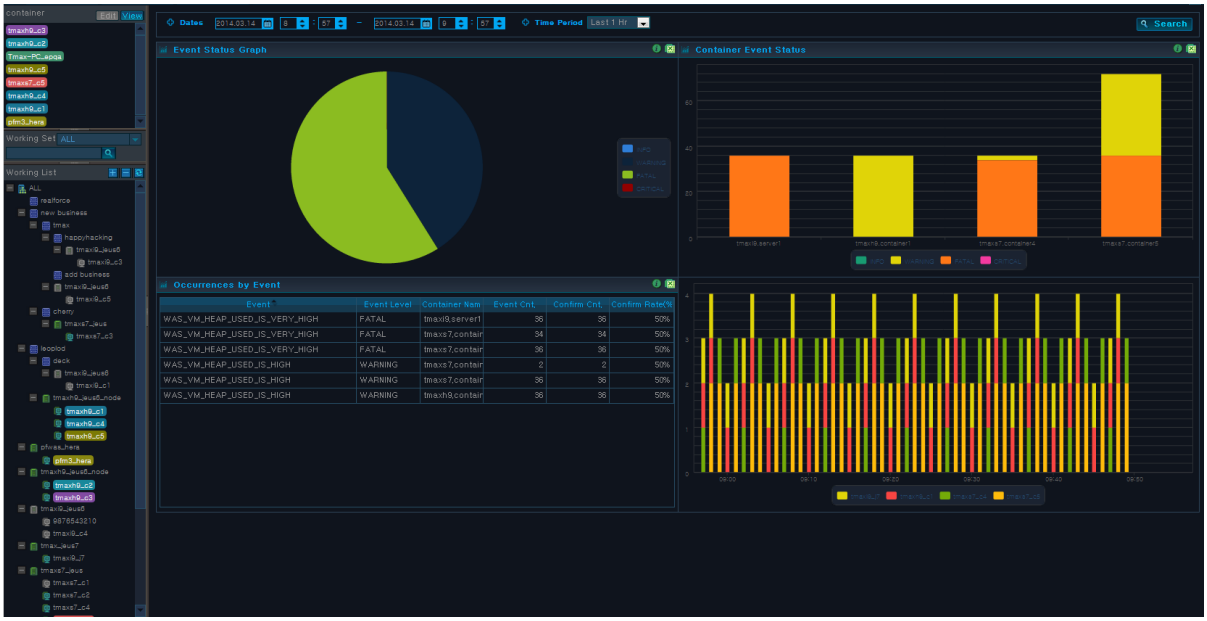
Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, 'Time Period' is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."

4.6. Event

Event displays Event Status Graph, Container Event Status, and Occurrences by Event table for each selected containers.

Event can be accessed from **[WAS] > [Analysis] > [Event]**.

[Figure 4.32] Analysis - Event



- **Search Condition**

  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, **'Time Period'** is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."

- **Chart**

  The following is description of the chart properties.

Chart	Description
Event Status Graph	Cumulative event status graph for the selected container(s) in the Working List. Event Occurrences for each container are collected for each event level (INFO, WARNING, BAD, CRITICAL) and are displayed using a pie chart.

Chart	Description
Container Event Status	– Top chart is a vertical stacked bar chart for the selected container(s) in the Working List. Event Occurrences for each container are collected for each event level (INFO, WARNING, BAD, CRITICAL). (X axis: Container Name, Y axis: Cumulative Event Occurrence Count) – Bottom chart is vertical stacked bar chart using the event occurrence count of the selected container(s) in the Working List (X : Selected Time Period, Y : Event Occurrence Count)

- **Occurrences by Event List**

  The following is description of the properties.

Property	Description
Event	Event name.
Event Level	Event level. (INFO, WARNING, BAD, CRITICAL)
Event Cnt.	Event occurrence count.
Confirm Cnt.	Event confirmation count.
Confirm Rate(%)	Event confirmation rate.

4.7. Visitor

Visitor displays the number of concurrent users, average active services, service executions, and hourly users by container.

Visitor can be accessed from **[WAS] > [Analysis] > [Visitor]**.

[Figure 4.33] Analysis - Visitor

- **Search Condition**

  Set the following search condition, and then click **[Search]**.

Search Condition	Description
Search Period	Manually enter the '**Dates**,' or select a '**Time Period**'. By default, 'Time Period' is set to "Last 10 Min." Other options include "Last 1 Hr," "Last 1 Week," and "Last 1 Month."

- **Chart**

  The following is description of the chart properties.

Chart	Description
Concurrent User Count	Number of concurrent users for the selected container(s) in the Working List. Data is collected using the following equation. `ConcurrentUser = Throughput(tps) * {Resp.Time(sec) + ThinkTime(sec)}` (X axis: Selected Time Period, Y axis: Number of Concurrent Users)
Users per Hr	Number of users per hour for the selected container(s) in the Working List. Collects hourly user count per container and displays the data using a vertical stacked bar chart. (X axis: Selected Time Period, Y axis: Hourly User Count)

Chart	Description
Avg. Active Service Count	Average number of active services for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Avg. Active Service Count)
Service Execution Count	Number of service executions for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: Service Execution Count)
JVM CPU Usage(%)	JVM CPU usage for the selected container(s) in the Working List. (X axis: Selected Time Period, Y axis: JVM CPU Usage(%))

4.8. Custom Report

In **Custom Report**, a user can select the desired report and create a menu for it.

Select a widget from **[ADMIN] > [Custom Dashboard] > [Report]**, and adjust its size and location. After arranging the report, save the report to register it in the **[Report]** menu. For detailed information, refer to "SysMaster Administrator's Guide".

Custom Report can be accessed from **[WAS] > [Analysis] > [Custom Report]**.

The following is an example of a custom report.

[Figure 4.34] Analysis - Custom Report

Chapter 5. Statistics/Reports

This chapter describes the **Statistics/Reports** screen.

5.1. Overview

Statistics/Reports screen provides various trend analyses for WAS, and displays various comprehensive data.

Statistics/Reports can be accessed from **[WAS] > [Statistics/Reports]**.

[Figure 5.1] WAS Analysis Statistics/Reports - Main Screen

Statistics/Reports Menu consists of the following two items.

- **Working List**

  Multiple containers can be selected from the Working List. For detailed information, refer to "1.4. Working List".

- **Statistics and Reports**

  Data is displayed in charts and using a summary table by container for the following menus.

Menu Item	Description
[Top N Trend]	Provides daily and monthly service trends. Shows the top 5 services according to the sort order.
[Relative Trend]	Provides relative daily and monthly service trends of search indicators.
[Report]	View summary information, and general and business reports.

5.2. TOP N Trend

Top N Trend displays top 5 services according to the sort order of the selected container using stacked bar graph.

Top N Trends can be accessed from **[WAS] > [Statistics/Reports] > [Top N Trend]**.

[Figure 5.2] Statistics/Reports - Top N Trend

- **Search Criteria**

  Set the following search criteria, and then click **[Search]**.

Search Criteria	Description
Search Period	Manually enter the '**Dates**,' or select a **'Time Period'**. 'Time Period' options include "Last 1 Day" or "Last 1 Month." Default value is "Last 1 Day." When "Last 1 Day" is selected, Trend Analysis is performed for the period between 01:00 and 24:00 of the previous day, and for the last month when "Last 1 Month" is selected.
Sort By	Select one of Avg Response Time, Success Cnt, or Fail Cnt.

- **Chart**

  X axis shows the selected time period, and Y axis changes according to sort the value. If Avg Response Time is selected, Y axis shows time value in sec. and an integer value for the others. The legend contains the service names in different colors.

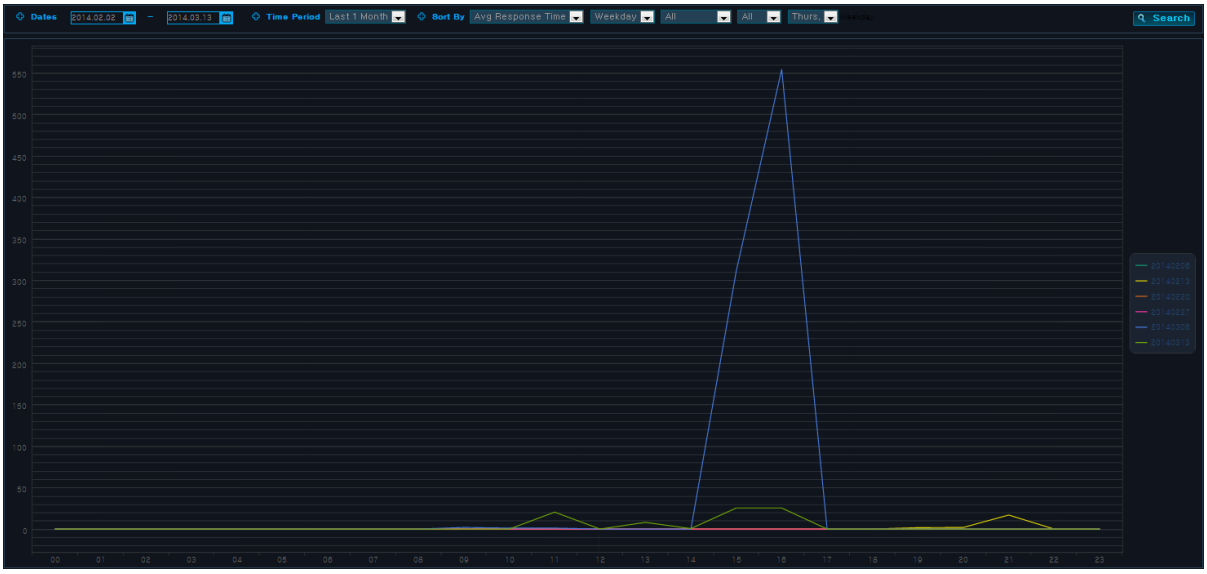
5.3. Relative Trend

Relative Trend displays daily service data for the selected container in the Working List by selecting a sort criteria (Avg Response Time, Success Cnt, Fail Cnt). Trends are analyzed for each day using a bar chart

Trend analysis considers one day as from 00:00 to 23:00. For example, the following chart can be used to analyze the trends of Avg Response Time for Mondays in July.

Relative Trend can be accessed from **[WAS] > [Statistics/Reports] > [Relative Trend]**.

[Figure 5.3] Statistics/Reports - Relative Trend - Example 1



- **Search Criteria**

  Set the following search criteria, and then click **[Search]**.

Search Criteria	Description
Search Period	Manually enter the '**Dates**,' or select a **'Time Period'**. 'Time Period' options include "Last 1 Month" or "Last 1 Year." Default value is "Last 1 Month." When "Last 1 Month" is selected, Trend Analysis is performed for the last month, and for the last year when "Last 1 Year" is selected.
Sort By	Select one of Avg Response Time, Success Cnt, or Fail Cnt.

- **Chart**

  X axis shows the time period between 0:00 and 23:00, and Y axis changes according to the sort value. If Avg Response Time is selected, Y axis shows time value in sec. and number for the others. The legend contains the dates of Mondays in July, and each represents Avg Response Time data for the time period between 0:00 and 23:00.

5.4. Report

Report displays tables of past data which can be saved as excel files.

Report can be accessed from **[WAS] > [Statistics/Reports] > [Report]** and consists of the following tabs.

- **[General Report]**

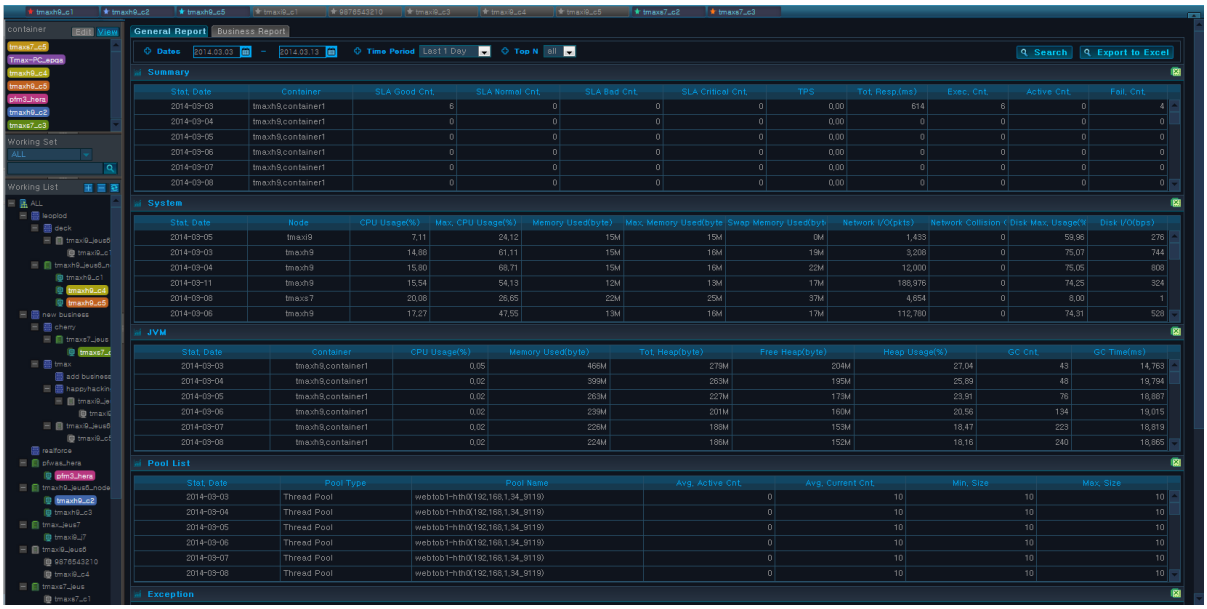
- **[Business Report]**

5.4.1. General Report

General Report displays tables of **Summary, System, JVM, Pool List, Exception, and Error Event**.

All tables can be exported to excel by clicking **[Export to Excel]**.

[Figure 5.4] Report - General Report



- **Search Criteria**

Set the following search criteria, and then click **[Search]**.

Search Criteria	Description
Search Period	Manually enter the '**Dates**,' or select a **'Time Period'**. 'Time Period' options include "Last 1 Day" or "Last 1 Month."
Time Period	Select **'Last 1 Day'** or **'Last 1 Month'**. – Last 1 Day: Displays 24 hours in units of an hour. – Last 1 Month: Displays 1 month in units of a day.
TOP N	Set the maximum number of rows for the table. Default value is 'all.' Other options include 20, 50, 100, and 300. Top N sorts the data by **'Stat. Date'**. Date in ascending order.

- **Summary**

Summary table displays container summary data.

Property	Description
Stat. Date	Date and time when container data was retrieved.
Container	Container name.
SLA Good Cnt.	Number of services with Good response time according to SLA.
SLA Normal Cnt.	Number of services with Normal response time according to SLA.
SLA Bad Cnt.	Number of services with Bad response time according to SLA.
SLA Critical Cnt.	Number of services with Critical response time according to SLA.
TPS	Number of services processed per second.
Tot. Resp.(ms)	Total service response time.
Exec. Cnt.	Number of service executions.
Succ. Cnt.	Number of successfully processed services.
Active Cnt.	Number of active services.
Fail. Cnt.	Number of failed services.

- **System**

System table displays system data.

Property	Description
Stat. Date	Date and time when node data was retrieved.

Property	Description
Node	Node name.
CPU Usage(%)	CPU usage.
Max. CPU Usage(%)	Max CPU usage.
Memory Used(byte)	Memory usage.
Max. Memory Used(byte)	Max memory usage.
Swap Memory Used(byte)	Swap memory usage.
Network I/O(pkts)	Network Packet I/O.
Network Collision Cnt.	Network collision count.
Disk Max. Usage(%)	Max disk usage.
Disk I/O(bps)	Disk I/O (bits per second).

- **JVM**

  JVM table displays JVM data.

Property	Description
Stat. Date	Date and time when container data was retrieved.
Container	Container name.
CPU Usage(%)	JVM CPU usage.
Memory Used(byte)	JVM memory usage.
Tot. Heap(byte)	JVM heap memory size.
Free Heap(byte)	Available JVM heap memory size.
Heap Usage(%)	JVM heap memory usage.
GC Cnt.	Number of times spent in Garbage Collection.
GC Time(ms)	Time spent in Garbage Collection.

- **Pool List**

  Pool List table displays pool data.

Property	Description
Stat. Date	Date and time when container data was retrieved.
Pool Type	Pool type. (DB Pool, Thread Pool)
Pool Name	Pool name.

Property	Description
Avg. Active Cnt.	Average number of active threads.
Avg. Current Cnt.	Average number of current threads. (Avg. Active Cnt. + Avg. Idle Cnt.)
Min. Size	Min pool size.
Max. Size	Max pool size.

- **Exception**

  Exception table displays exception data.

Property	Description
Stat. Date	Date and time when container data was retrieved.
Exception Name	Exception name.
Container	Name of the container where exception occurred.
Exception Cnt.	Number of exception occurrences.

- **Error Event**

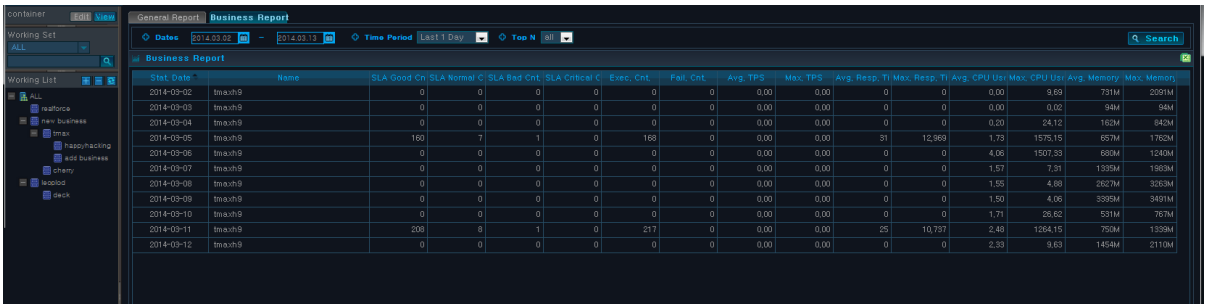
  Error event table displays error event data.

Property	Description
Container	Container name.
Event	Event name.
Event Level	Event level. (INFO, WARNING, CRITICAL, FATAL)
Event Cnt.	Number of event occurrences.

5.4.2. Business Report

Business Report displays data for selected business in a table.

[Figure 5.5] Report - Business Report



- **Search Criteria**

  Set the following search criteria, and then click **[Search]**.

Search Criteria	**Description**
Search Period	Manually enter the '**Dates**,' or select a **'Time Period'**. 'Time Period' options include "Last 1 Day" or "Last 1 Month."
Time Period	Select **'Last 1 Day'** or **'Last 1 Month'**. – Last 1 Day: Displays 24 hours in units of an hour. – Last 1 Month: Displays 1 month in units of a day.
TOP N	Set the maximum number of rows for the table. Default value is 'all.' Other options include 20, 50, 100, and 300. Top N sorts the data by **'Stat. Date'**. Date in ascending order.

- **Business Report**

  The following is description of **Business Report** table properties.

Property	**Description**
Stat. Date	Date and time when business data was retrieved.
Name	Business name.
SLA Good Cnt.	Number of services with Good response time according to SLA.
SLA Normal Cnt.	Number of services with Normal response time according to SLA.
SLA Bad Cnt.	Number of services with Bad response time according to SLA.
SLA Critical Cnt.	Number of services with Critical response time according to SLA.

Property	Description
Exec. Cnt.	Number of service executions.
Fail. Cnt.	Number of failed service.
Avg. TPS	Average number of services processed per second.
Max. TPS	Max number of services processed per second.
Avg. Resp. Time(ms)	Average service response time.
Max. Resp Time(ms)	Max service processing time.
Avg. CPU Usage(%)	Average CPU usage.
Max. CPU Usage(%)	Max CPU usage.
Avg. Memory Used(byte)	Average memory usage.
Max. Memory Used(byte)	Max memory usage.

Appendix A. Data Collection

This appendix describes the data collection technology.

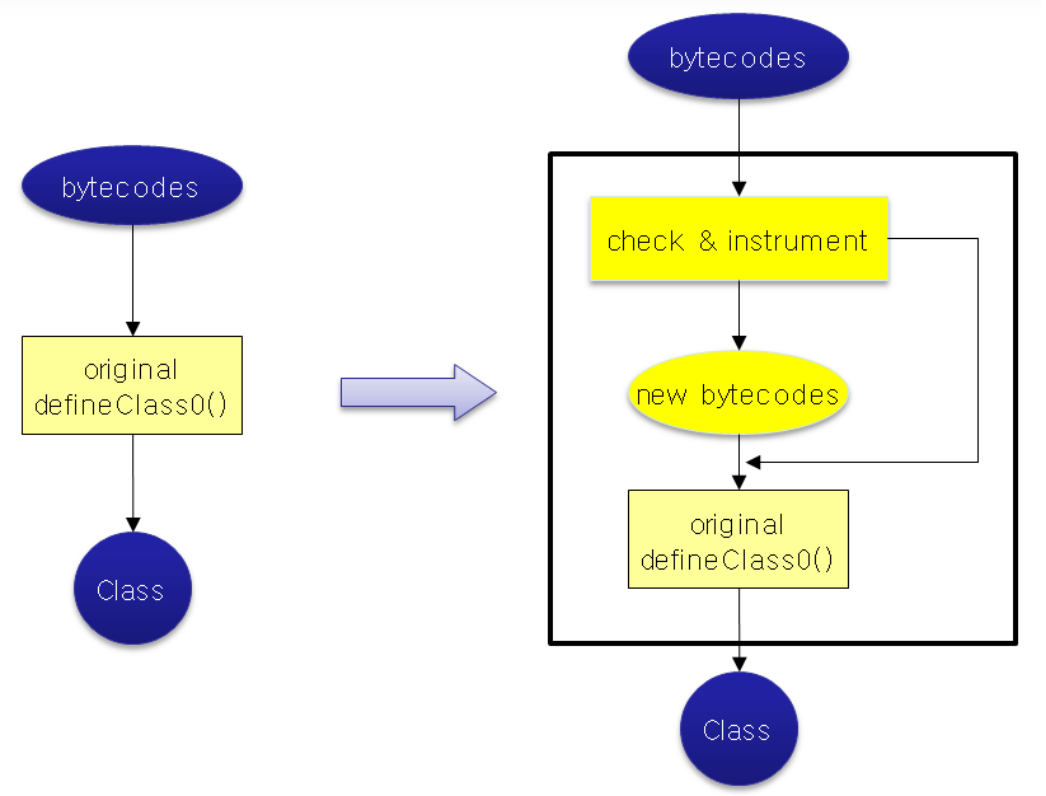
A.1. Dynamic BCI

SysMaster monitors WAS using the BCI (Byte Code Instrumentation) technology. Dynamic BCI is used to insert new code in Java without source modification.

If WAS uses the option to include the SysMaster library when it starts up, it can be monitored without affecting the existing logic. For more information, refer to "Appendix B. SysMaster DC Configuration".

The following is a flow that shows how to insert bytecode into the existing logic.

[Figure A.1] Bytecode Insertion



In JDK 1.4 and earlier, ClassLoader.class must be manually modified. In JDK 1.5 and later, the instrument package provided by JDK is used to define and apply the premain class and the 'java –agent' option is used.

Insert new bytecode logic before or after an original method to not affect the method processing.

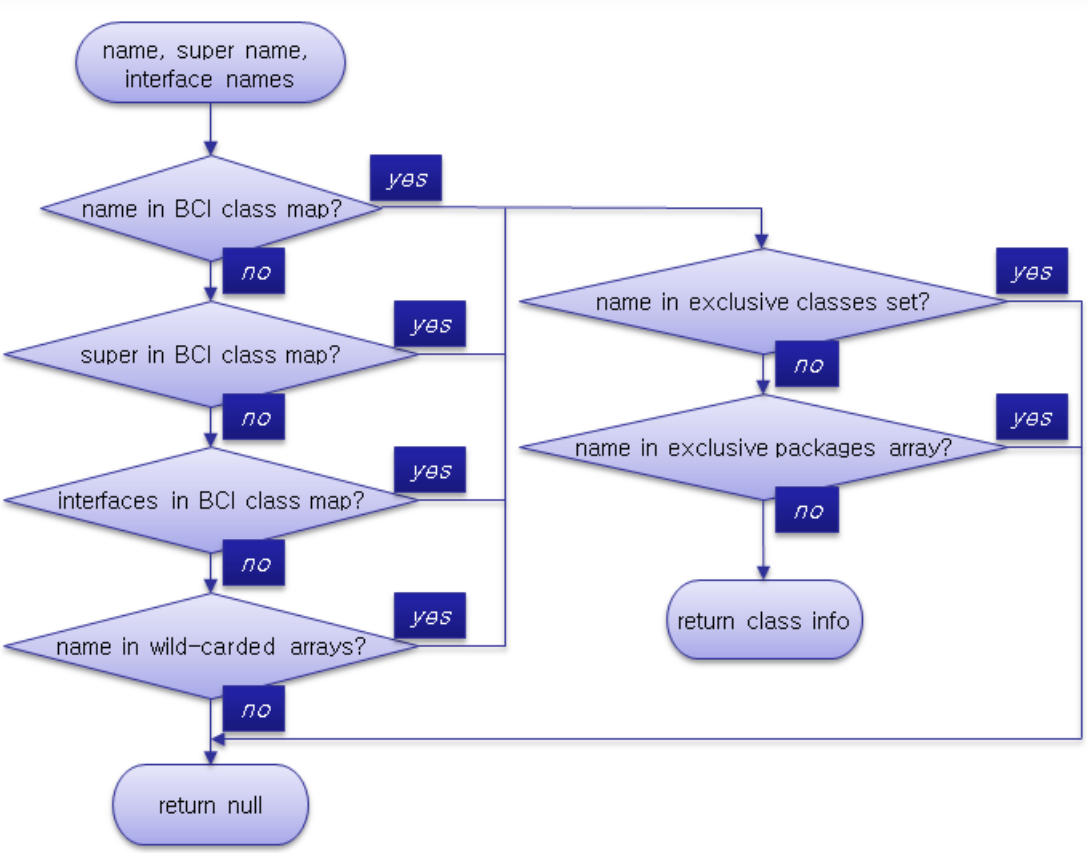
A.2. User-defined BCI

Each user can monitor WAS by specific package, class, or method.

SysMaster uses a configuration file to monitor WAS. Each user can apply BCI to desired classes by configuring bci.config.file=/home/apmwas/smhome/config/sminst.properties. For more information, refer to "Appendix B. SysMaster DC Configuration".

When the configuration is applied, BCI is processed with the following flow.

[Figure A.2] User-defined BCI Process



Specify a user-defined class according to the following format.

```
class type :
    C(Class)
    I(Interface)
    A(Unknown : class + interface)

level :
    0(all)
    1(enabled only when self-matched)
```

```
    2(enabled only when super or interface-matched)

class attribute tag string and value :
    X(method to be excluded):X@"name"@"desc“
    F(forced instrumentation): F@"type char(S: super, I: interface, W:
wildcarded)“
    Z(method to be excluded by Access): Z@access type@...(public : 1, private
 : 2, protected : 4)

method attributes and value :
    T(trace including time check)
    I(time check)
    P(parameter): P@"parameter index“
    R(return): R
    U(user defined attribute): U@"value“
    G(user defined start transaction if GEN type)

BCI classese exclusion entry : "*C*"="class name":...
BCI packages exclusion entry : "*P*"="partial class name":...
```

The following is a configuration example.

```
Class Info
full class name = bci type + class type + options(exclude method, exclude
method access)
Method Info
method name + method description + level + attribute

com/tmax/apm/TestClass=GEN,C,X@<init>@*,Z@2@4:\
testMethod,(Ljava/lang/String;I[I)V,0,T
```

The following is an HttpServlet configuration example.

```
javax/servlet/http/HttpServlet=JSP,C,X@<init>@*:\
service,(Ljavax/servlet/http/HttpServletRequest;Ljavax/servlet/http/HttpServletResponse;)V,0,T:\
doFilter,(Ljavax/servlet/ServletRequest;Ljavax/servlet/ServletResponse;Ljavax/servlet/FilterChain;)V,0,T
```

To monitor WAS in units of a specific class or method after user-defined classes have been defined, refer to *SysMaster*. "3.7.2. Profiling".

Appendix B. SysMaster DC Configuration

This appendix describes how to configure SysMaster DC.

B.1. JEUS Environment Configuration

SysMaster settings must be included in JEUSMain.xml, the default JEUS configuration file. SysMaster settings are added to the engine container's <command-option> element by either manually editing the file or using JEUS WebManager.

The following settings need to be configured.

- Boot Classpath Setting

  Use -Xbootclasspath/p option of JVM to set SysMaster files, sminst_rt.jar.

  The following is an example.

  ```
  -Xbootclasspath/p:/smagent/dc/sminst_rt.jar
  ```

- System Property Setting

  Set the path of the sm.properties file that contains the configuration properties for SysMaster.

  The following is an example.

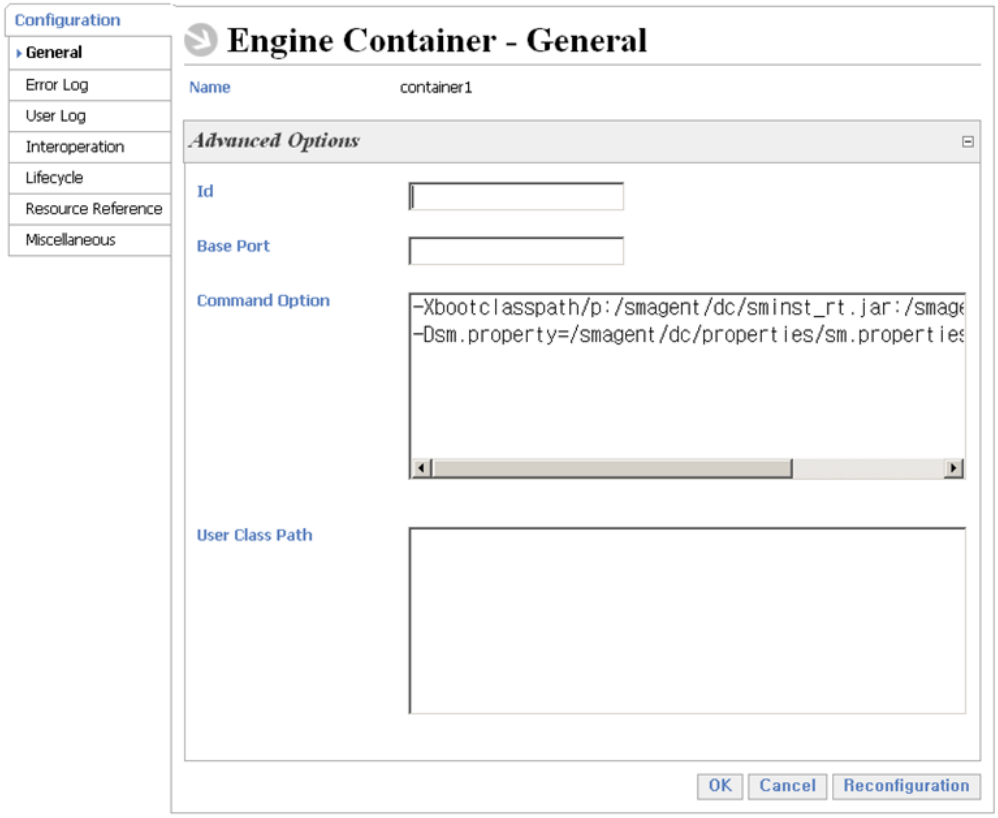
  ```
  –Dsm.property=/smagent/dc/properties/sm.properties
  ```

Configuring Using JEUS WebManager

1. When a target monitoring container is selected from JEUS node tree, **Engine Container** screen is displayed.

   Select Engine Container screen from **[Configuration]** > **[General]** tab.

[Figure B.1] Configuring Using JEUS WebManager



2. Enter the settings in the **'Command Option'** field.

```
 -Xbootclasspath/p:/smagent/dc/sminst_rt.jar
–Dsm.property=/smagent/dc/properties/sm.properties
```

3. Click **[OK]** to save, and then restart the engine container to apply the changes.

Modifying JEUSMain.xml File

1. Open the JEUSMain.xml file in a text editor, and add settings in the <command-option> element inside the <engine-container> element.

```
<?xml version="1.0" encoding="utf-8"?>
<jeus-system xmlns="http://www.tmaxsoft.com/xml/ns/jeus">
    <node>
        <name>jeuswas</name>
        <engine-container>
            <name>container1</name>
            <command-option>
            -Xbootclasspath/p:/smagent/dc/sminst_rt.jar
```

```
            -Dsm.property=/smagent/dc/properties/sm.properties
            ....
            </command-option>
            <engine-command>
                <type>ws</type>
                <name>engine1</name>
            </engine-command>
...
```

2. Save the changed settings, and then restart the engine container.

B.2. WebLogic Configuration

For WebLogic WAS configuration, add options to the start up shell (Oracle/Middleware1036/usr_projects/domains/[domain name]/bin/startWebLogic.sh).

```
export JAVA_OPTIONS="${JAVA_OPTIONS}

-agentpath:/home/daehun/sysmaster/agents/was_dc/dcagent/jvmti/linux2.x/libdcagent64.so

 -javaagent:/home/daehun/sysmaster/agent/was_dc/sminst_rt.jar
 -Xbootclasspath/p:/home/daehun/sysmaster/agent/was_dc/sminst_rt.jar

-Dsm.property=/home/daehun/sysmaster/agent/was_dc/sm_properties/weblogic.properties"
```

Save the settings, and then restart WebLogic.

B.3. sm.properties File Configuration

To collect container data, container-specific settings must be configured in WAS Node tab as well as in the sm.porperties file.

Note

For more detailed information, refer to "SysMaster Installation Guide".

Each container's sm.properties file is referenced by the environment file of the target WAS during startup. For JEUS, add settings to the JEUSMain.xml environment file.

```
<engine-container>
<name>container1</name>
<command-option>
…
```

```
    -Dsm.property=/data/ apmqas/agent3011/dc/sm.properties1
</command-option>
```

Locate and open the sm.properties file to configure various monitoring related settings. Save the changed settings, and then restart WAS to apply the changes. Set each option value to true or false. (Default value : false)

```
sm.home=/data1/tmaxqas/agent3009/dc
…
#oomerror.detect.enable=true
socket.trace.enable=true
file.trace.enable=true
sun.threadtime.bug.enable=true
bci.classload.trace.enable=true
```

Appendix C. Thread Dump Configuration

This appendix describes about configuring thread dump settings.

C.1. JEUS Environment Configuration

The following describes JEUS configuration that is needed when looking up thread dump from the SysMaster console screen.

- Configuring JEUSMain.xml to record logs in JeusServer.log

```
<node>
        <name>jeuswas</name>
        <class-ftp>true</class-ftp>
        <sequential-start>true</sequential-start>
        <enable-webadmin>true</enable-webadmin>
        <system-logging>
            <level>FINE</level>
            <handler>
                <console-handler>
                    <name>consoleHandler</name>
                    <level>INFO</level>
                </console-handler>
                <!-- file-handler setting must be included. -->
                <file-handler>
                    <name>fileHandler</name>
                    <level>FINE</level>
                </file-handler>
            </handler>
        </system-logging>
  …
</node>
…
```

- Configuring JEUSMain.xml to record jvm logs for the corresponding container

  Add the following to the jvm option part of each container.

```
   -XX:+UnlockDiagnosticVMOptions
   -XX:+LogVMOutput
  -XX:LogFile=/home/daehun2/jeus609/logs/ubunqa/ubunqa_container1/jvm.log
```

Appendix D. Event Adaptor Configuration

This appendix describes how to configure SysMaster Event Adaptor to write user code for seding SMS and e-mails, etc.

Configuration Procedure

The following are the steps for configuring the Event Adaptor.

1. Write a class by implementing sysmaster.master.event.EventSupport.

```
public interface EventSupport {
    public void init() throws Exception;
    public void publish(EventInfo info) throws Exception;
    public void stop() throws Exception;
}
```

   Write initialization code in the init() method. The publish(EventInfo info) method is called whenever an event occurs. In the stop() method, write a routine for terminating SysMaster.

2. Compress the code written in step 1, and save it to the following path.

```
MASTER_HOME/jeus/lib/application
```

3. Set an Event class name in the sysmaster.properties file.

   – Configuration method

   ```
   event.class=class full name
   ```

   – Example

   ```
   event.class=event.EventTest
   ```

4. Restart Master. If the Event class setting fails to be applied, the following message (info) is recorded in MASTER_HOME/logs/smlog.container1 (or smlog) or an exception occurs.

```
[EventAdaptor]EventSupport class is not defined.
```

Example Code

EventInfo class methods are referenced when writing code to handle jobs by event level or events related to a specific container.

The following is an example code of event.EventTest.java.

```
package event;

import java.io.BufferedWriter;
import java.io.File;
import java.io.FileWriter;
import java.io.IOException;

import sysmaster.Logger;
import sysmaster.master.event.EventInfo;
import sysmaster.master.event.EventSupport;

public class EventTest implements EventSupport {

private BufferedWriter bufferedWritter;
private FileWriter fileWriter;

private File file;

@Override
public void init() throws Exception {
  try{
   file = new File("/data1/sysmaster/test/event.txt");
      if(!file.exists()){
       file.createNewFile();
      }
      fileWriter = new FileWriter(file, true);
      bufferedWritter = new BufferedWriter(fileWriter);
      Logger.info("Event Adaptor is initialized");
     }catch(IOException e){
      Logger.error("Initializtion is failed", e);
     }
}
@Override
public void publish(EventInfo info) throws Exception{
  try{
         bufferedWritter.write(info.getMsgText() + "\n");
         bufferedWritter.flush();
     }catch(IOException e){
      Logger.error("Event publishing is failed", e);
     }
```

```
}
@Override
public void stop() throws Exception {
  try{
   bufferedWritter.close();
         fileWriter.close();
         file.delete();
     }catch(IOException e){
      Logger.error("Stopping event adaptor is failed", e);
     }
 }
}
```