

# Monitoring a Domain

# Objectives

After completing this lesson, you should be able to:

- Configure and access WebLogic Server logs
- Enable WebLogic Server debugging output
- Monitor WebLogic Server health and performance
- Monitor JDBC data sources
- Access diagnostic charts in the Monitoring Dashboard

# WebLogic Server Logs














The subsystems of an instance of WebLogic Server publish information about themselves into logs.

Log	Description
Server log	Used by server subsystems to record events
Standard out	Some server log messages are printed to standard out.
Domain log	Some server messages are gathered by the administration server for inclusion into the domain-wide log.
Access log	Used by the HTTP subsystem to track HTTP communication
Audit log	Tracks security requests. Requires configuring an Auditing provider (not configured by default).

# WebLogic Server Logs

Log	Description
<b>Transaction log</b>	<ul style="list-style-type: none"><li>• Contains information about transactions being managed by WebLogic Server</li><li>• Is used by that server when recovering from crashes</li><li>• Is in binary format</li></ul>
<b>JMS Server log</b>	<ul style="list-style-type: none"><li>• Is enabled when a JMS Server is created</li><li>• Message destinations must be specifically enabled.</li><li>• Contains information on basic message lifecycle events</li></ul>

# WebLogic Server Log Locations

Directory	Description
 <i>domainname</i>	
 <i>servers</i>	
 <i>AdminServer</i>	Admin server (named <i>AdminServer</i> ) directory
 <i>logs</i>	
 <i>AdminServer.log</i>	The server log file for <i>AdminServer</i>
 <i>domainname.log</i>	The domain log
 <i>server1</i>	Directory for managed server named <i>server1</i>
 <i>logs</i>	
 <i>server1.log</i>	The server log file for <i>server1</i>
 <i>access.log</i>	HTTP subsystem log
 <i>jmsServers</i>	
 <i>jmsservername</i>	
 <i>jms.messages.log</i>	JMS lifecycle events of the JMS Server called <i>jmsserverame</i> created on <i>server1</i>

# Log Message Severity Levels

Severity levels from low to high impact:

Severity	Description
<b>TRACE</b>	Used for messages that are part of WebLogic Diagnostic Framework
<b>DEBUG</b>	Messages from enabled "debug flags"
<b>INFO</b>	Normal operation information
<b>NOTICE</b>	More important operation information
<b>WARNING</b>	Something suspicious occurred, but it might not affect normal operation.
<b>ERROR</b>	A user level error has occurred, but the system or application can handle it with no interruption and limited degradation of service.

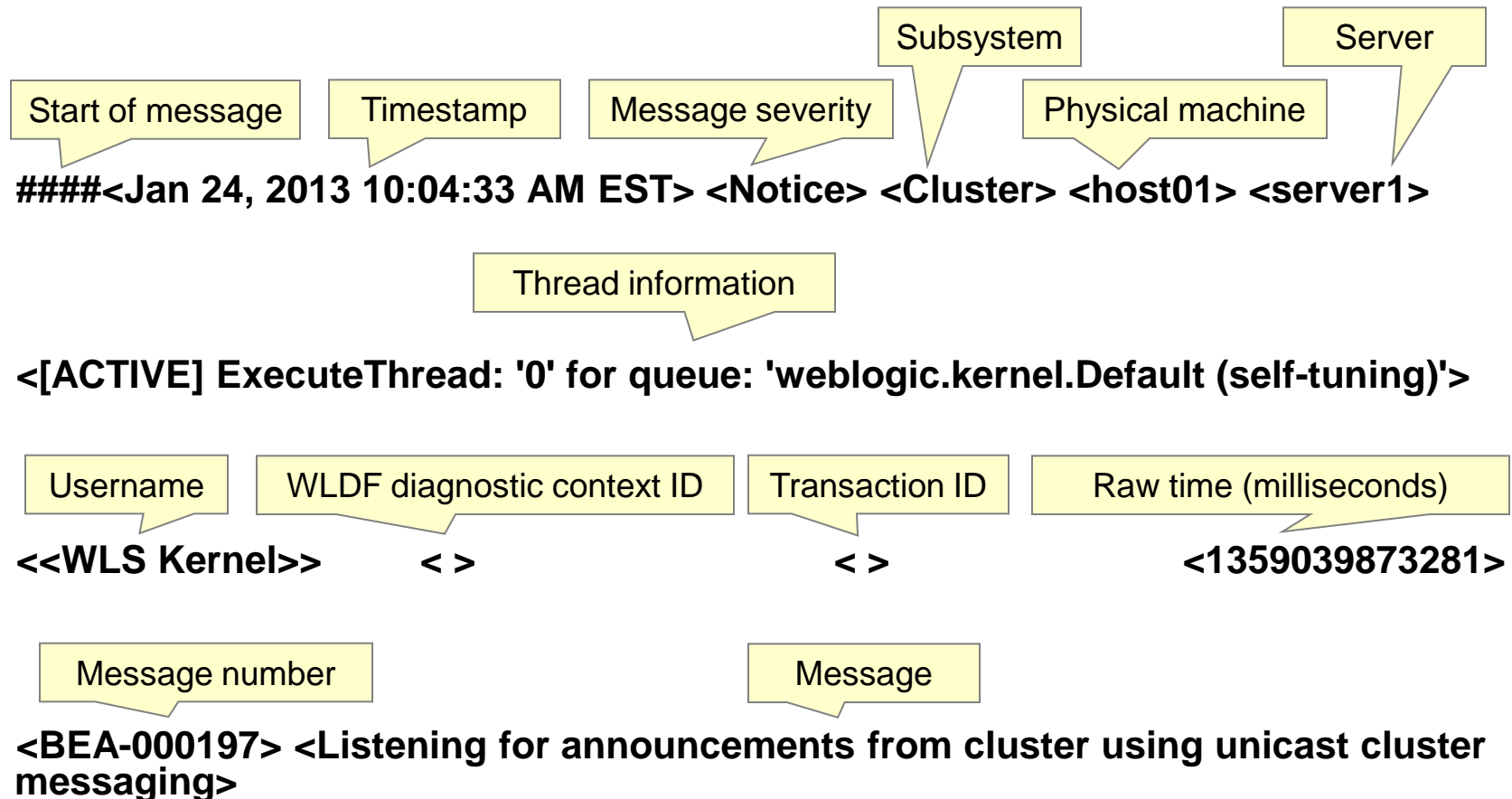
# Log Message Severity Levels

Severity	Description
<b>CRITICAL</b>	A system or service level error has occurred. The system can recover, but there may be momentary loss or permanent degradation of service.
<b>ALERT</b>	A particular service is unusable, while other parts of the system still function. Automatic recovery is not possible. Immediate attention of an administrator is needed.
<b>EMERGENCY</b>	The server is unusable. This indicates a severe system failure.



# Understanding Log File Entries

Log message format:





# Accessing the Logs from the Admin Console

**Domain Structure**

- wlsadmin
  - Environment
  - Deployments
  - Services
  - Security Realms
  - Interoperability
  - Diagnostics
    - Log Files**

**Log Files**

View Showing 1 to 7 of 7 Previous | Next

	Name ^	Type	Server
	ServerLog	Server Log	AdminServer

View Showing 1 to 7 of 7 Previous | Next

1

2

**Server Log Entries (Filtered - More Columns Exist)**

View Previous | Next

	Date ^	Subsystem	Severity	Message ID	Message
	Jan 24, 2013 3:40:24 PM EST	Health	Info	BEA-310002	12% of the total memory in the server is free.

3

# Configuring Server Logging


Settings for server1

Configuration Protocols **Logging** Debug Monitoring


**General** HTTP Data Source

Save

Use this page to define the general logging settings for this server.

 **Log file name:** logs/server1.log

**Rotation**

 **Rotation type:** By Size ▼

**Rotation file size:** 5000

**Begin rotation time:** 00:00

**Rotation interval:** 24

☒ **Limit number of retained files**

**Files to retain:** 100

Logging tab

Must restart server for these changes to occur

Log file rotation type: By Size or By Time or None

Disabled because By Size selected

Keep the latest 100 server logs

# Configuring Server Logging

The screenshot shows a configuration window with a tab labeled "Advanced". Below the tab are three settings:

- Minimum severity to log:** A dropdown menu currently set to "Info". A callout box points to this dropdown with the text "Minimum severity for all logs".
- Logging implementation:** A dropdown menu currently set to "JDK". A callout box points to this dropdown with the text "Choose either Log4J or JDK logging".
- Redirect stdout logging enabled:** A checkbox that is currently unchecked. A callout box points to this checkbox with the text "If enabled, redirects server standard out to logs".

# Configuring Server Logging

Each log “location” has its own setting for minimum severity level and can have its own log filter.

— Message destination(s) —

**Log file :**

**Severity level:** Trace ▼

**Filter:** None ▼

...

**Standard out :**

**Severity level:** Notice ▼

**Filter:** None ▼

**Domain log broadcaster :**

**Severity level:** Warning ▼

**Filter:** None ▼

**Buffer Size:** 10

Domain  
broadcast  
buffer size

# Error Messages Reference

Use the WebLogic Server online Error Messages Reference document to obtain more information about a specific log message based on its ID.

**Oracle® WebLogic Server Error Messages Reference**  
**12c Release 1 (12.1.2)**  
Part Number E26117-01

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## 1 BEA-000001 to BEA-2160002

**BEA-000001: Server must be started by Node Manager when consensus leasing is enabled.**

**Cause:** The server was not started by Node Manager.

**Action:** Start the server using Node Manager.

**Level:** 1

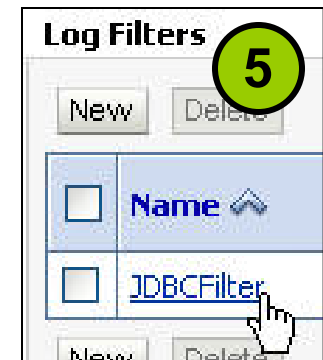
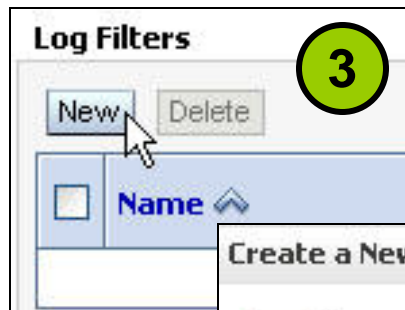
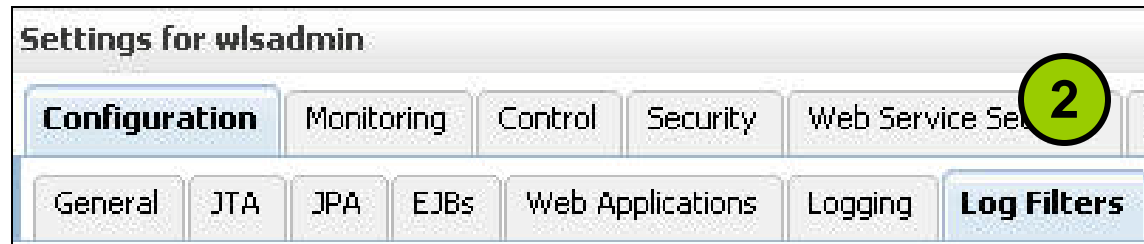
**Type:** INTERNAL\_ERROR

**Impact:** ConsensusLeasing

# Log Filters

- Provide finer tuned control of the log messages that are published
- Are based on the values of message attributes
- Are created at the domain level
- Can be applied to different log message destinations:
  - Server log
  - Server log memory buffer
  - Server standard out
  - Domain log broadcaster

# Creating a Log Filter



# Creating a Log Filter



OK Cancel

**Add Expression**

The following expressions will be used to identify your Watch rule.

What message attribute would you like to select?

**Message Attribute:** SUBSYSTEM

Select the message attribute

What operator would you like to select?

**Operator:** =

Select the operator

What is the value of your expression?

**Value:** JDBC

Enter a value



# Creating a Log Filter

The screenshot shows the 'Config Log Filter Expressions' window. At the top left is a 'Save' button with a mouse cursor over it. Below it is the text 'Add expressions to create the rule your Log Filter'. On the right is a green circle with the number '8'. The main section is titled 'Current Log Filter Expressions:' and contains a text area with the expression: `(MESSAGE LIKE '%pool%') AND (SUBSYSTEM = 'JDBC')`. A yellow callout bubble points to the '%' character in the expression, stating '% is a wildcard.'. To the right of the text area is an 'Edit' button, with a yellow callout bubble stating 'Expressions can also be manually edited.'. Below the 'Current Log Filter Expressions' section is the 'Expressions :' section. It contains a row of buttons: 'Add Expressions', 'Combine', 'Uncombine', 'Move Up', 'Move Down', 'Remove', and 'Negate'. Below these buttons are two expression entries, each with a checkbox and a dropdown menu. The first entry is ☐ MESSAGE LIKE '%pool%' and the second is ☐ SUBSYSTEM = 'JDBC'. Between these two entries is a dropdown menu currently showing 'And'. A yellow callout bubble points to this dropdown menu, stating 'Ensure the expressions are combined correctly.'.

Save

Config Log Filter Expressions

Add expressions to create the rule your Log Filter

**Current Log Filter Expressions:**

```
(MESSAGE LIKE '%pool%') AND (SUBSYSTEM = 'JDBC')
```

Edit

**Expressions :**

Add Expressions Combine Uncombine Move Up Move Down Remove Negate

☐ MESSAGE LIKE '%pool%'

And ▼

☐ SUBSYSTEM = 'JDBC'

% is a wildcard.

Expressions can also be manually edited.

Ensure the expressions are combined correctly.

# Applying a Log Filter

**1**

Settings for server1

Configuration Protocols **Logging** Debug Monitor

General HTTP Data Source

**2**

— Advanced —

— Message destination(s) —

Log file :

Severity level: Warning

**3**

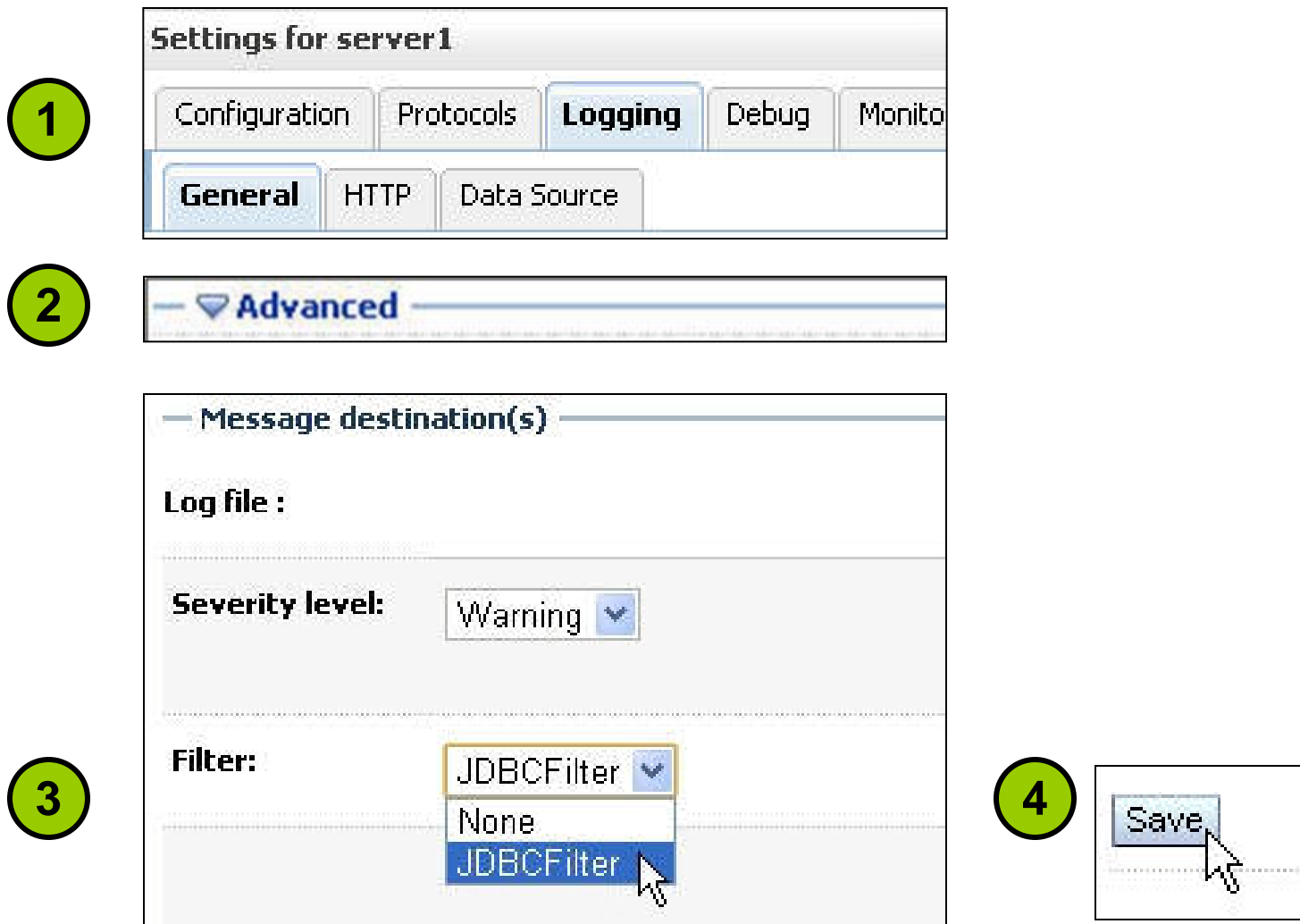
Filter: JDBCFilter

None

JDBCFilter

**4**

Save



# Subsystem Debugging

- Various WebLogic Server subsystems have the ability to generate detailed log messages to facilitate debugging.
- You can enable debugging on specific servers for individual subsystems.

**Settings for server1** 1

Configuration Protocols Logging **Debug** 2 Monitoring Control Deploy

**Debug settings for this Server**

3 Enable Disable Clear Showing 1 to 2 of 2 Previous | Next

<input type="checkbox"/>	Debug Scopes and Attributes ^	State
<input type="checkbox"/>	+ default	Disabled
<input type="checkbox"/>	- weblogic	Disabled
<input checked="" type="checkbox"/>	+ application	Enabled

# Debug Scopes

- Debug flags (attributes) for WebLogic Server subsystems are organized into *scopes*.
  - You can enable entire debug scopes or individual attributes.
  - When a parent scope is enabled, all child scopes and attributes are also enabled, unless they are overridden.

<input type="checkbox"/>	<input type="checkbox"/> weblogic	Disabled
<input type="checkbox"/>	<input checked="" type="checkbox"/> application	Enabled
<input type="checkbox"/>	<input checked="" type="checkbox"/> classloader	
<input type="checkbox"/>	<input type="checkbox"/> cluster	Enabled
<input type="checkbox"/>	<input type="checkbox"/> leasing	Enabled (Inherited)
<input type="checkbox"/>	<input type="checkbox"/> databaseless	Enabled (Inherited)
<input type="checkbox"/>	DebugConsensusLeasing	Enabled (Inherited)

Scopes

When in doubt about which scope or attribute to choose, enable a parent category.

Attribute

# Debug Scopes: Examples

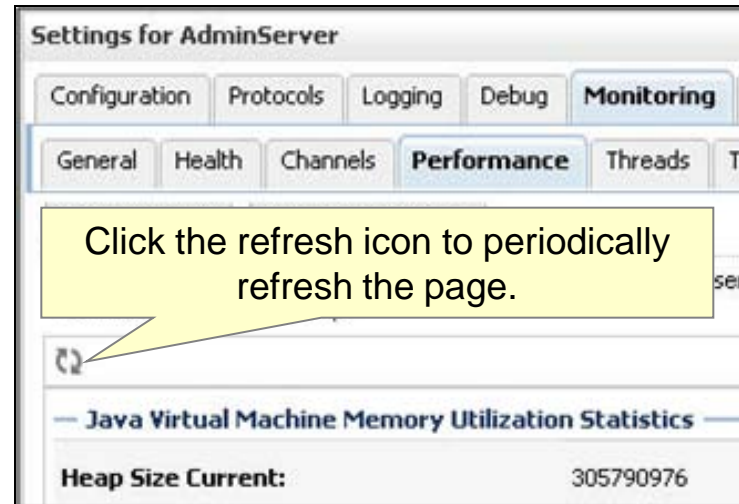
Subsystem	Scopes (weblogic.*)
JDBC	jdbc.connection, jdbc.internal, jdbc.sql
Cluster	core.cluster
Deployment	deploy, ejb.deployment
Applications	application.library, ejb.caching, ejb.invoke, ejb.pooling, servlet, servlet.internal, servlet.internal.session
Transactions	transaction.recovery, transaction.twopc, transaction.xa
Security	security, security.ldap, security.ssl

All “debug scope” messages are the DEBUG severity level, so ensure the log location severity level is set appropriately.

# Admin Console: Monitoring Domain Resources

The administration console can monitor domain resources:

- Servers
- Clusters
- Machines
- Deployments
- JDBC data sources
- And more



Use the Domain Structure to locate the type of resource. Select a particular instance. Then click the **Monitoring** tab. The **Monitoring** tab of some elements have subtabs.

- When data is displayed in a table, use the **Customize this table** link to modify the columns displayed.

# Monitoring the Domain

The domain itself has a **Monitoring** tab, which can show you an overview of the domain's health, servers, clusters, and migration.

The screenshot shows the 'Settings for wlsadmin' interface with the 'Monitoring' tab selected. Under 'Monitoring', the 'Health' sub-tab is active. A text box states: 'This page allows you to monitor health information for this domain.' Below this, there is a 'Health:' label, a dropdown menu set to 'All', and a 'Filter' button. A yellow callout box points to the 'Filter' button with the text: 'Choose a certain state (like "Failed") and click **Filter** to limit which servers are displayed.' Below the filter controls is the 'Health Information' section, which includes a table showing the status of various servers. The table has columns for 'Server/Subsystem Name', 'State', 'Health', and 'Reason'. It shows four entries: AdminServer, server1, server2, and server3. The first three are in a 'RUNNING' state with 'OK' health, while server3 is in a 'SHUTDOWN' state and is 'Not reachable'.

Settings for wlsadmin

Configuration **Monitoring** Control Security Web Service Security

**Health** Servers Clusters Migration

This page allows you to monitor health information for this domain.

Health: All


Health Information

Showing 1 to 4 of 4 Previous | Next

Server/Subsystem Name	State	Health	Reason
AdminServer	RUNNING	OK	
server1	RUNNING	OK	
server2	RUNNING	OK	
server3	SHUTDOWN	Not reachable	

# Monitoring All Servers





The servers table in the admin console lists all the servers in a domain. The information displayed can be customized so you can use this table to see the information important to you.

 **Customize this table** To customize the information displayed

**Servers (Filtered - More Columns Exist)**

Click the **Lock & Edit** button in the Change Center to activate all the buttons on this page.

Showing 1 to 4 of 4 Previous | Next

<input type="checkbox"/>	Name 	Cluster	Machine	State	Health	Heap Free Current	Heap Size Current
<input type="checkbox"/>	AdminServer(admin)		machine1	RUNNING	 OK	165433584	342294528
<input type="checkbox"/>	server1	cluster1	machine1	RUNNING	 OK	173135168	349372416
<input type="checkbox"/>	server2	cluster1	machine2	RUNNING	 OK	245126888	331153408



# Monitoring Server Health

The admin console server health monitoring page shows the state of the server's subsystems and deployments.

**Settings for server1**

Configuration

Protocols

Logging

Debug

**Monitoring**

General

**Health**

Channels

Performance

Threads

Timers




Use this page to monitor health information for this server.

**Server Health:** OK

**Reason:** (No value specified)

**Health information details**

Showing 1 to 10 of 11 [Previous](#) | [Next](#)

<b>Subsystem</b> 	<b>Health</b>	<b>Reason</b>
JDBC	 OK	
JTA	 OK	

# Monitoring Server Performance

The admin console server performance monitoring page shows information on the JVM.

Request the JVM do a garbage collection now.

Have the admin console refresh the screen periodically.

Settings for server1

Configuration Protocols Logging Debug **Monitoring**

General Health Channels **Performance** Threads T

Garbage Collect Dump Thread Stacks

↻

— Java Virtual Machine Memory Utilization Statistics —

Heap Size Current:	320471040
Heap Free Current:	123103200
Heap Free Percent:	58
Heap Size Max:	477233152

# Monitoring Data Source Health

The admin console data source monitoring lets you view data source state and many statistics about its health and activity.

**Settings for datasource1**

Configuration

Targets

**Monitoring**

Control

Security

Notes

**Statistics**

Testing

▶ **Customize this table**

Many data source attributes are available when you customize the table.

**Deployed Instances of this Data Source (Filtered - More Columns Exist)**

Showing 1 to 1 of 1 Previous | Next

Server	Enabled	State	JDBC Driver
server1	true	Running	oracle.jdbc.xa.client.OracleXADataSource

# Example Data Source Performance Attributes

Customize the data source monitoring table to display performance data. For example:

Attribute	Description
<b>Active Connections Current Count</b>	The number of database connections currently in use
<b>Current Capacity</b>	The total number of connections in the connection pool
<b>Failed Reserve Request Count</b>	The running total of connection requests that could not be fulfilled
<b>Leaked Connection Count</b>	The number of connections reserved but not returned to the connection pool
<b>Number Available</b>	The number of connections idle and available for use

# JMX, MBeans, Managing, and Monitoring

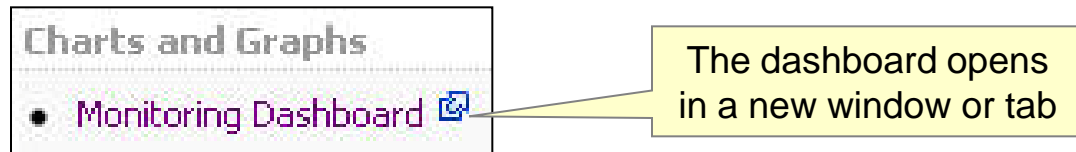
WebLogic Server manages and monitors its resources by using the Java Management Extensions (JMX) API.

- JMX provides a standardized way of managing and monitoring resources through objects call MBeans (managed beans).
- WebLogic Server provides a large set of MBeans for all the resources that it manages and monitors.
  - These MBeans are used by WebLogic Server tools like the administration console, WLST, and the Monitoring Dashboard.

# Monitoring Dashboard

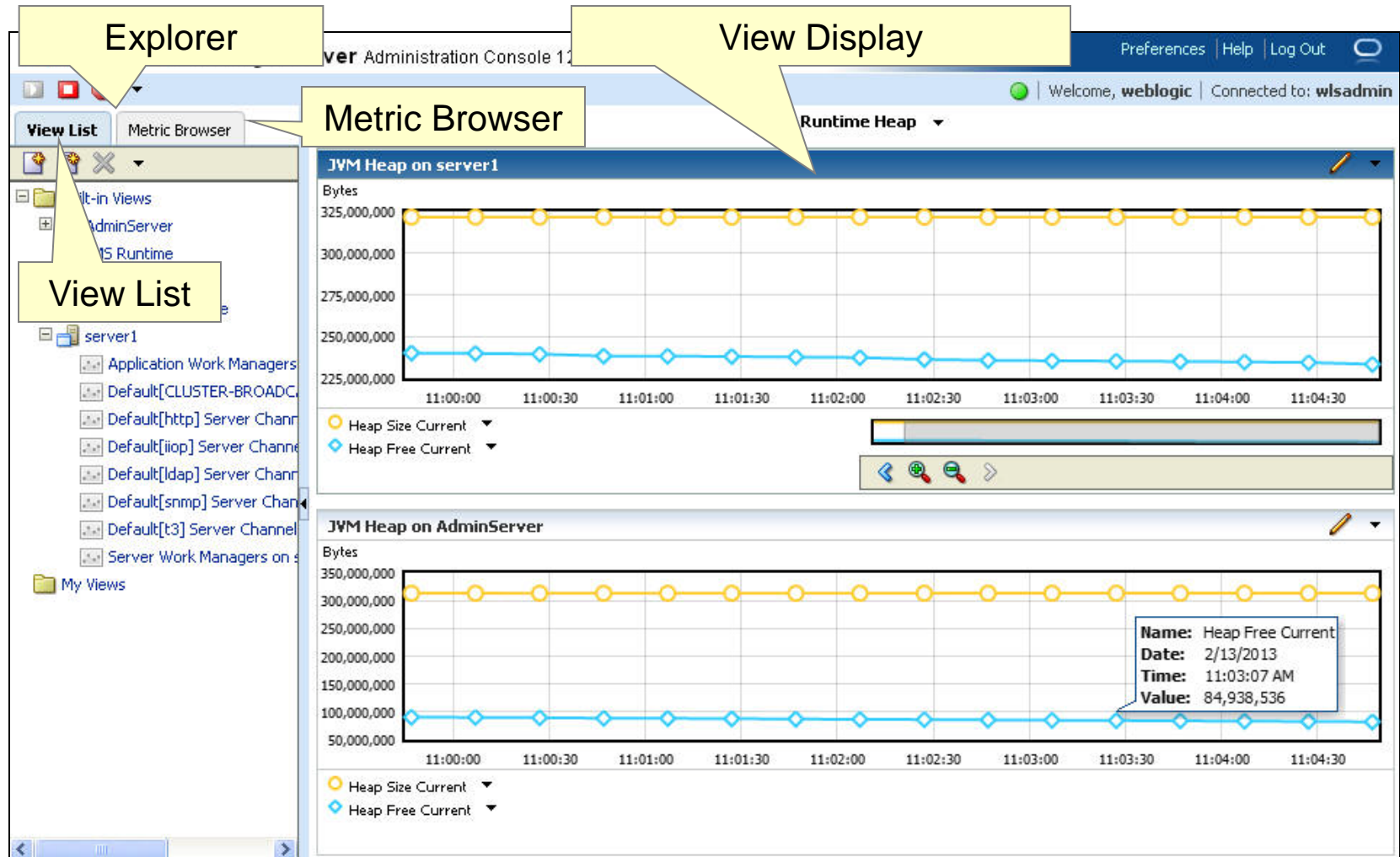
The Monitoring Dashboard:

- Is accessible from a link on the administration console home page



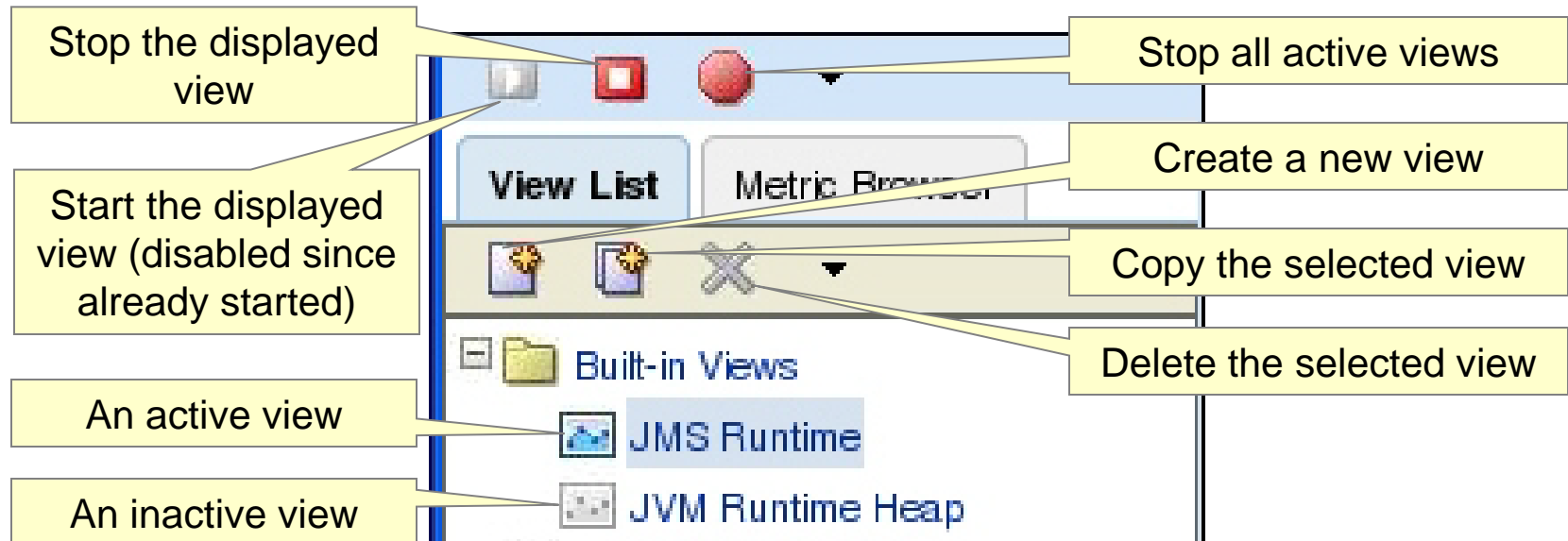
- Graphically presents current or historic WebLogic Server diagnostic data
  - Multiple graph types are available
- Allows you to monitor WebLogic Server MBean attributes
  - From active runtime MBeans (*polled metrics*)
  - From an archive collected by WLDF (*collected metrics*)

# Monitoring Dashboard Interface



# Views

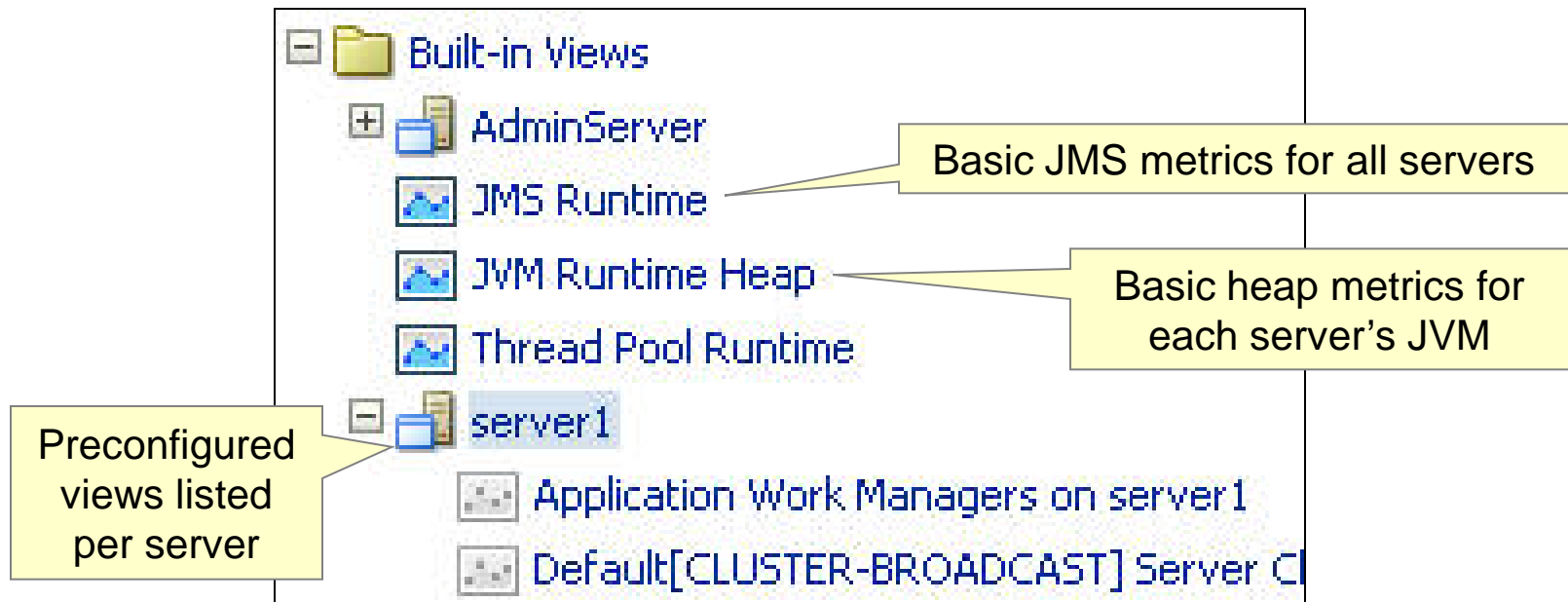
- Are a way to organize your charts and graphs
- Typically display metrics that are related in some way
- Are individually started (to collect data) and stopped
- Continue to collect data even when not being displayed



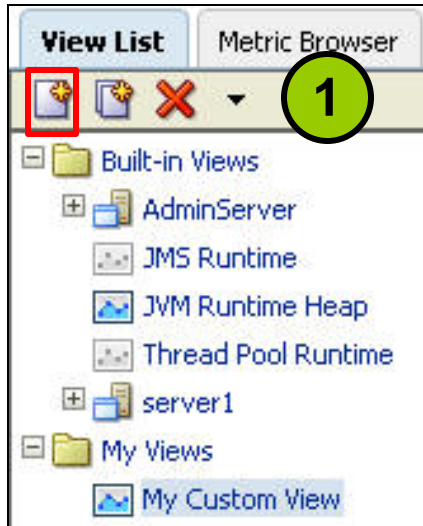


# Built-in Views

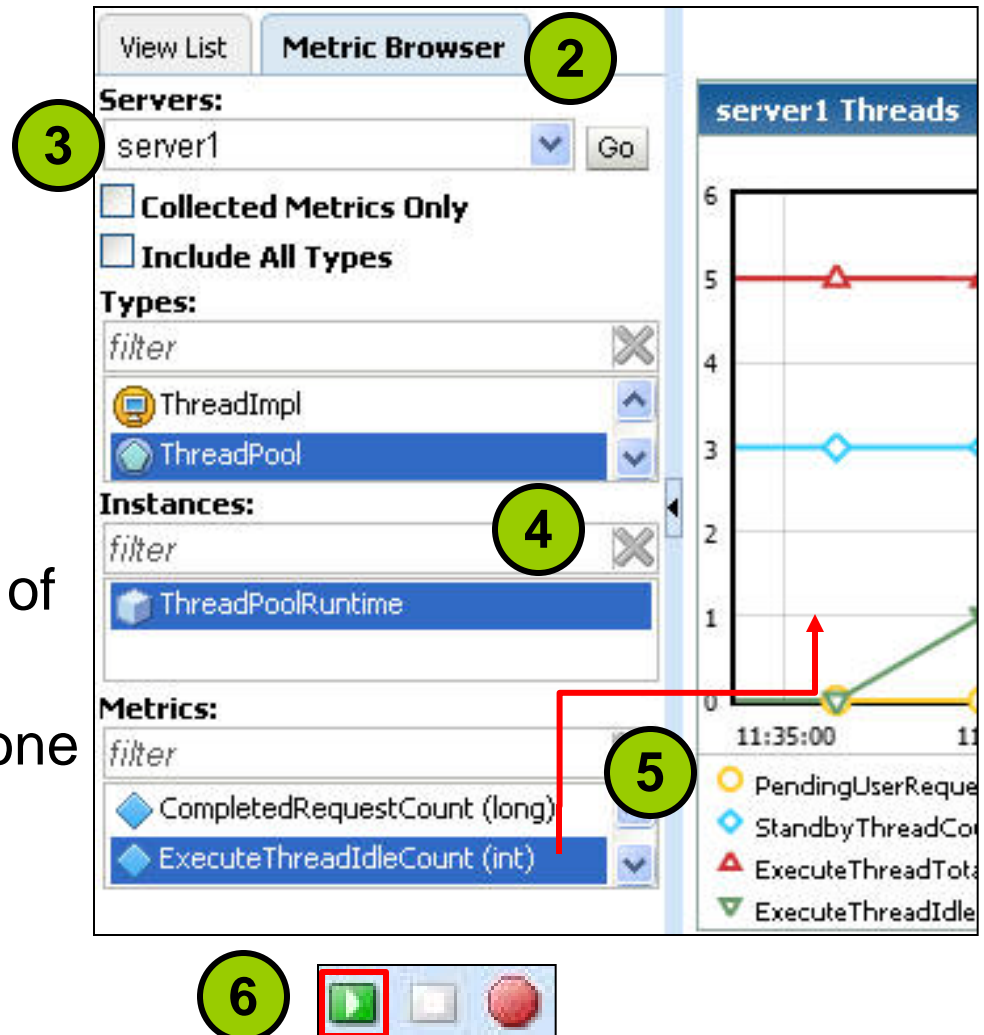
- The dashboard defines built-in views for some of the more critical runtime performance metrics.
- Built-in views cannot be modified (or deleted), but they can be copied and the copy modified.



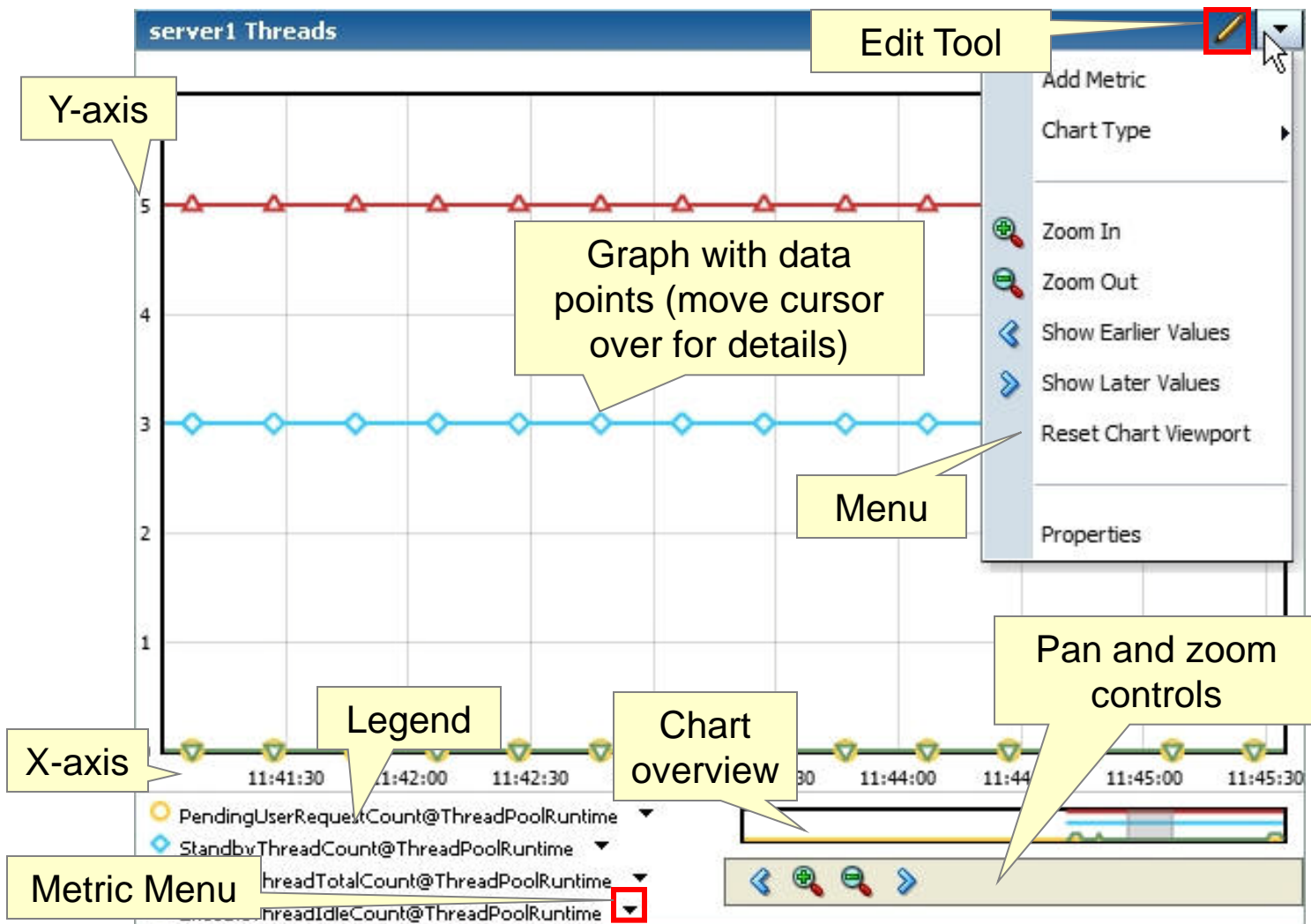
# Creating a Custom View



- A view is a collection of charts.
- Each chart contains one or more graphs.
- Each graph displays one MBean attribute.

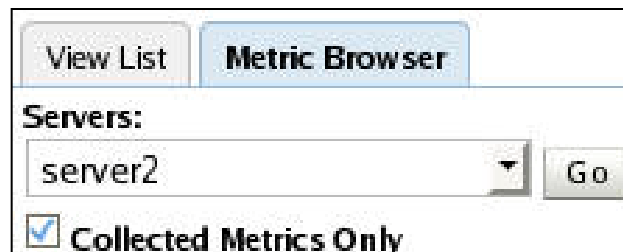


# Anatomy of a Chart



# Current or Historical Data

- To view real-time metrics, no set up is needed. When a view is started, the runtime MBean instances are polled.
- To view historical (collected) metrics, WLDF must have been previously configured to collect data. Metrics collected by WLDF are placed into the diagnostic archive. To view harvested data:
  1. In the View List, click the New View button.
  2. In the Metric Browser, select a Server.
  3. To see only harvested data, select Collected Metrics Only.
  4. Drag some attribute from the Metrics list to the new view.



The screenshot shows a dialog box titled "Metric Browser". It has two tabs: "View List" and "Metric Browser", with the latter being selected. Below the tabs, there is a section labeled "Servers:" containing a text input field with "server2" and a "Go" button. At the bottom, there is a checkbox labeled "Collected Metrics Only" which is checked.

# Quiz

Which list of severity levels is in order from bad to worse?

- a. ERROR, CRITICAL, ALERT, EMERGENCY
- b. ALERT, ERROR, CRITICAL, EMERGENCY
- c. ERROR, ALERT, CRITICAL, EMERGENCY
- d. ERROR, CRITICAL, EMERGENCY, ALERT

# Quiz

A log filter can be applied to only one log message destination at a time.

- a. True
- b. False

# Summary

In this lesson, you should have learned how to:

- Configure and access WebLogic Server logs
- Enable WebLogic Server debugging output
- Monitor WebLogic Server health and performance
- Monitor JDBC data sources
- Access diagnostic charts in the Monitoring Dashboard

# **Practice 8-1 Overview:**

## **Working with WebLogic Server Logs**

This practice covers the following topics:

- Accessing the server log by using the admin console
- Creating and applying a log filter



# **Practice 8-2 Overview: Monitoring WebLogic Server**

This practice covers the following topics:

- Monitoring a server by using the admin console and the Monitoring Dashboard
- Monitoring JDBC data sources by using the admin console
- Enabling debugging by using the admin console