

SAP Web Application Server 6.40

SAP Logging & Tracing API

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Agenda

n Logging and Tracing Overview

n Configuring your J2EE development system for logging and tracing.

n Log Configurator, Categories, Locations and Destinations.

n Setting up your J2EE engine for viewing Standard Output and Error.

n The Logging and Tracing API.

Agenda

n **Logging and Tracing Overview**

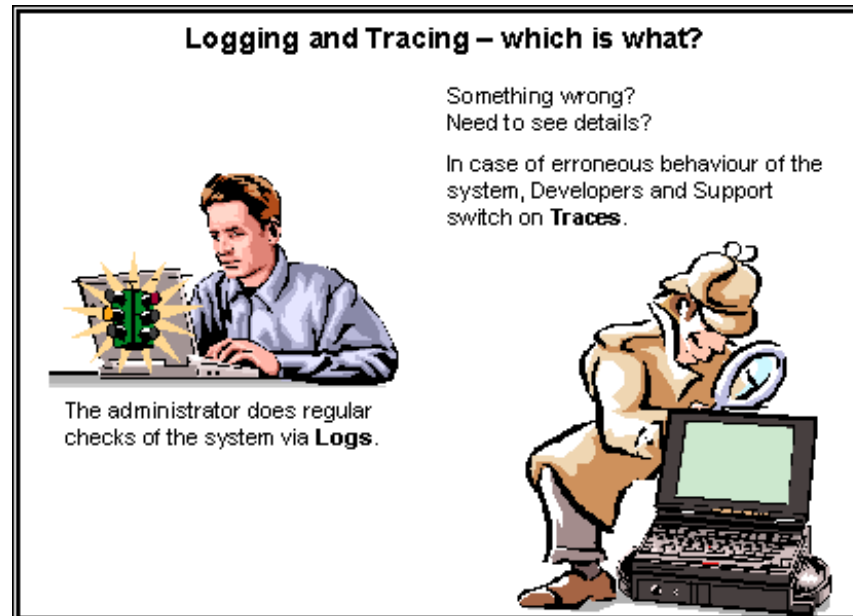
n **Configuring your J2EE development system for logging and tracing.**

n **Log Configurator, Categories, Locations and Destinations.**

n **Setting up your J2EE engine for viewing Standard Output and Error.**

n **The Logging and Tracing API.**

Logging and Tracing (1)



- ▶ **Logs are addressed to an administrator, who supervises the system during normal operation.**
- ▶ **Traces are addressed to Developers and Support, who need details about the control flow of the software.**

Logging and Tracing (2)

Logging

- n Record normal or exceptional events.
- n Switched on during normal operation.
- n log messages are emitted to **categories which describe distinguished problem areas.**
 - u Database problems
 - u Security auditing
- n Log messages are also visible in the trace.

Tracing

- n Reconstruction of the control flow of a running application.
- n Used during development or problem detection in productive systems (alternative to debugging).
- n Trace messages are emitted to **locations** which describe delimited code areas such as packages or classes.
- n **Please keep in mind that trace messages are turned off by default and are only turned on in case of known problems!**

Logging & Tracing Default Configuration

- n **All traces by default go to the default trace file.**
 - n Good for performance.
 - u On **production systems**, this is a must!!!
 - n Hard to find your trace messages.
 - u **Solution:** Configure development systems to pipe traces and logs for applications into their own specific trace file.

- n **Error severity level traces and logs are written out by default.**
 - n Will not see lower level messages that are not of severity error or worse.
 - n Make sure **production systems** only write out Error and worse severity messages!

- n **Standard output messages are not written to the trace file by default.**
 - n Using System.out will get you know where unless you configure your system correctly!

Log Severity Descriptions

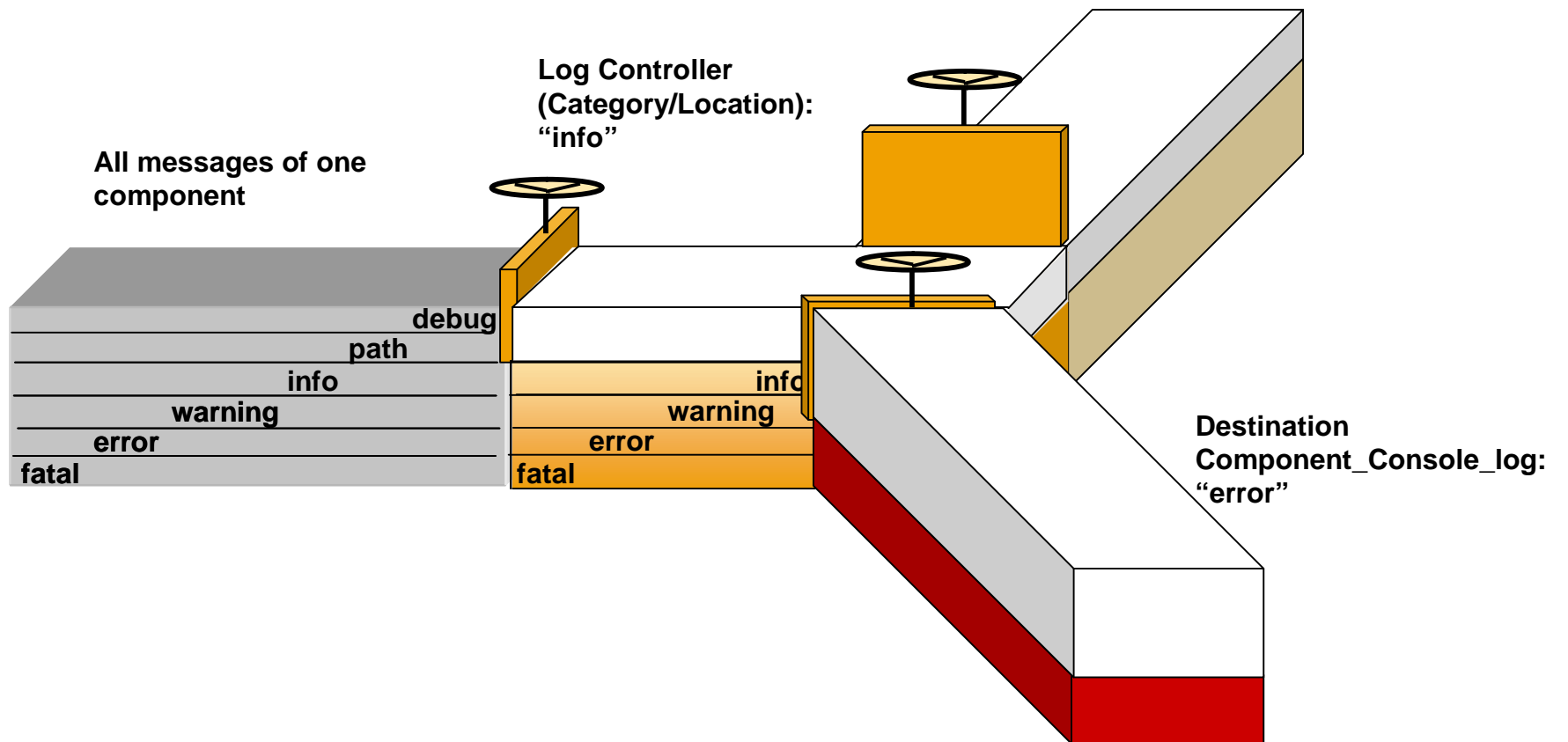
Severity	Value	Description
<i>Info</i>	300	Informational text to record an event, which does not have and also does not need any follow-up activity. It should help to understand the normal operation or could provide further information for later reviews, audits or investigations.
<i>Warning</i>	400	The application processing can and will proceed, but later follow-up activity by persons responsible for the specific category is necessary to avoid error situations in the future. Information of how to solve the problem in the future should be available.
<i>Error</i>	500	The application processing terminates without completing the desired tasks. The application is still usable, but corrective actions need to be performed to avoid the erroneous termination in the future. Information of how to solve the problem should be available. If not, customers will need to open problem messages to solve the problem.
<i>Fatal</i>	600	The application processing terminates without completing the desired tasks. The application is not usable anymore and cannot be started without corrective actions by experts. Customers will normally need to open problem messages to solve the problem.

Trace Severity Descriptions

Overview about severities usable for trace messages

Severity	Value	Description
<i>Debug</i>	100	Information only valuable for developers to analyze the internal status of a program.
<i>Path</i>	200	Information for developers and support engineers to understand the execution flow of a program. <code>entering()</code> & <code>exiting()</code> as well as <code>throwing()</code> & <code>catching()</code> method calls will supply their information on this severity level.
<i>Info</i>	300	Informational text to record information valuable for support engineers and developers to understand and trace the business logic, e.g. business document numbers, status changes etc.
<i>Warning</i>	400	Information about anomalies in program execution, which could be worked around, but which may lead to errors or may explain error situations happening later.

Logging logic



Key Tools and Services

Visual Administrator

n Used to Configure the Log Configuration – Log Configurator Service

n Used to view traces and logs – Log Viewer Service.

Config Tool

n Used to configure Logging behavior properties.

SAP NetWeaver Developer Studio

n Used to configure and develop logging for your J2EE based applications.

Log Viewer in VA

The screenshot displays the SAP Log Viewer interface. On the left, a tree view shows the directory structure: Cluster (1005858L) > Server 0 0_39795 (1005858L) > C:\usr\sap > ccms\J2E_00\j2ee\3979550 > J2EWC00\j2ee\cluster\server0 > com.sap.pmi.adm > log. The log files listed include 2: applications.log, 30: defaultTrace.trc, 59: sat.trc, and 151: usersession.log.

The main area shows a table of log entries with columns for Time, Category, Date, and Message. The table is filtered to show 143 entries. The 'Find' bar is set to search in the 'Time' column, and 'Case sensitive' is unchecked. The table contains the following entries:

Time	Category	Date	Message
13:02:22:314	/System/Server	11/16/2004	Another Simple TEST
13:02:22:314	/System/Server	11/16/2004	ERROR CATEGORY TEST
12:01:53:164	/System/Server...	11/16/2004	SLD data collector run succ
12:01:51:362	/System/Server...	11/16/2004	Failed to read secure store
12:01:51:312	/System/Server	11/16/2004	Path to object does not exist
12:01:51:251	/System/Server	11/16/2004	Path to object does not exist
12:01:51:211	/System/Server	11/16/2004	Path to object does not exist
12:01:51:121	/System/Server	11/16/2004	Path to object does not exist
12:01:50:991	/System/Server	11/16/2004	Path to object does not exist
12:01:50:931	/System/Server	11/16/2004	Path to object does not exist
12:01:50:771	/System/Server	11/16/2004	Path to object does not exist
12:01:50:520	/System/Server	11/16/2004	Path to object does not exist
12:01:47:135	/System/Server	11/16/2004	Path to object does not exist
12:01:46:184	/System/Server...	11/16/2004	Failed to read secure store
11:59:46:636	/System/Server	11/16/2004	Path to object does not exist
11:58:07:219	/System/Server	11/16/2004	The synchronization of appl
11:58:07:209	/System/Server	11/16/2004	Operation startApp on appli
11:58:07:209	/System/Server	11/16/2004	Operation startApp over app
11:58:07:209	/System/Server	11/16/2004	Start of application [sap.cor
11:58:07:209	/System/Server	11/16/2004	DataSources or DataSourc
11:58:07:048	/System/Server	11/16/2004	Path to object does not exist

At the bottom of the interface, there are buttons for 'Exclude in Current Log', 'Exclude Globally', 'Include in Current Log', and 'Include Globally'. The status bar at the bottom right shows '100%' zoom.

The log files of the J2EE engine and all applications can be viewed in the Log Viewer inside the Visual Administrator.

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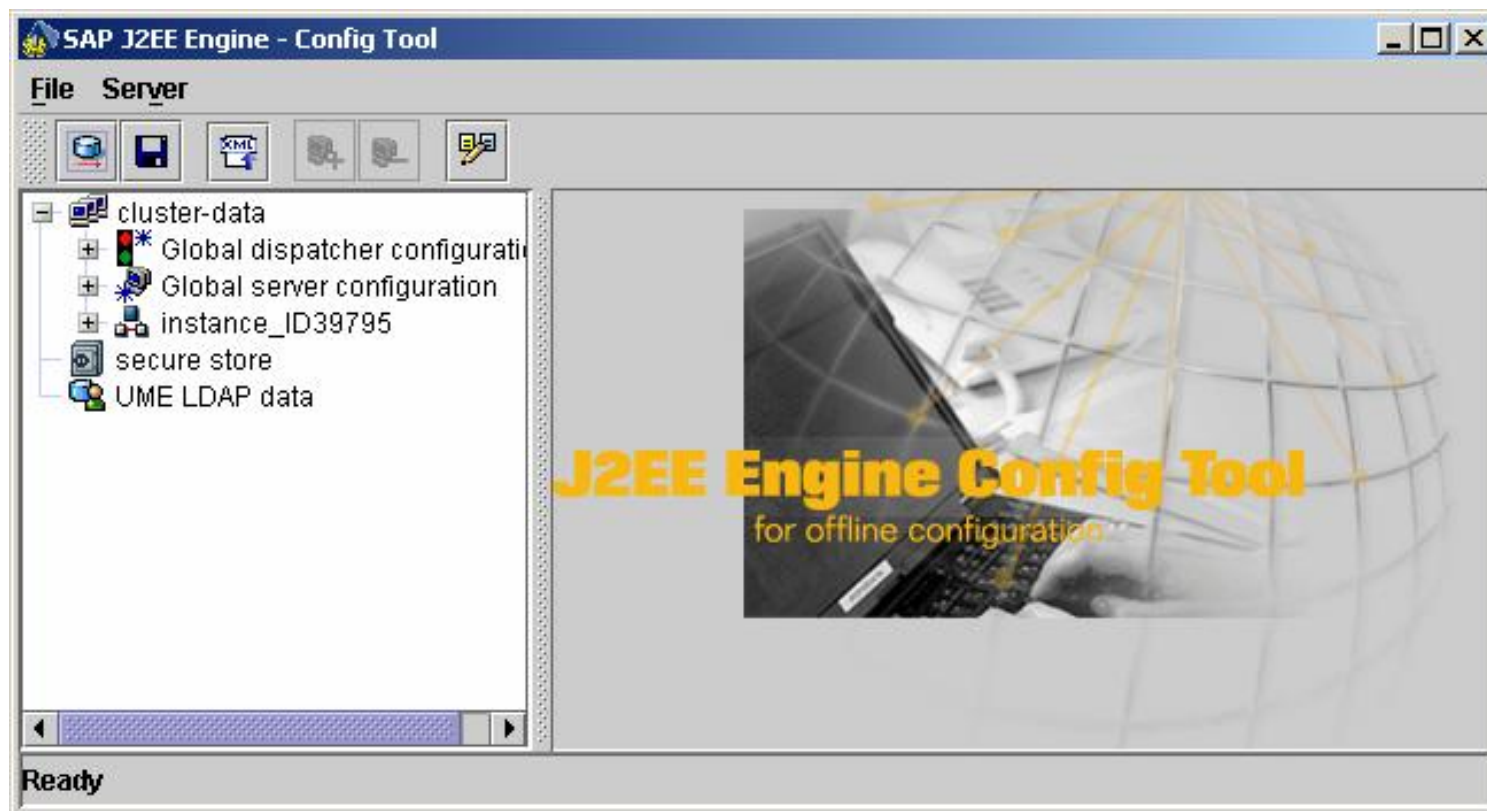
n **The Logging and Tracing API.**

Start the Config Tool


n Start the Config Tool.

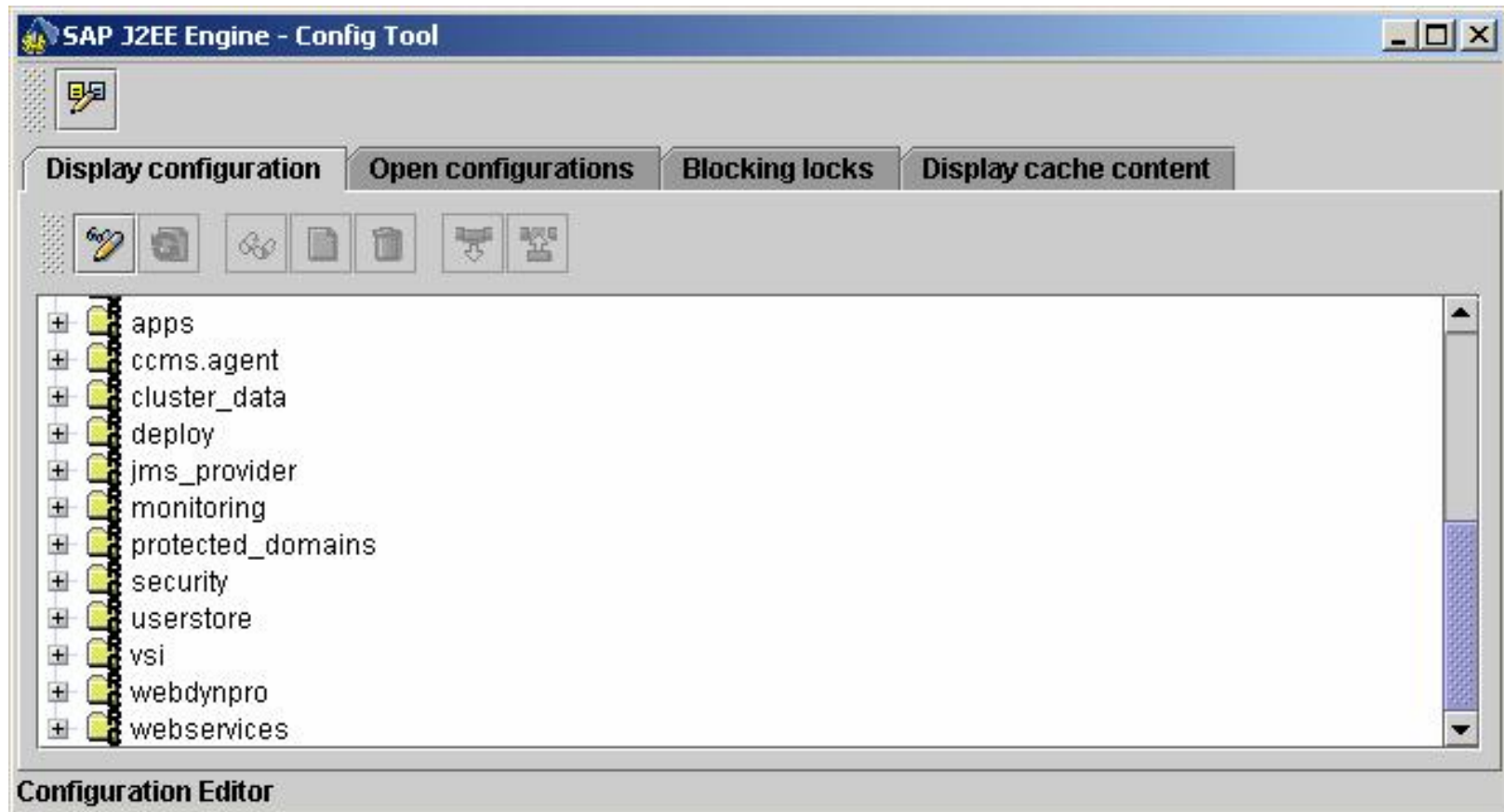
n Example Location:

C:\usr\sap\J2E\JC00\j2ee\configtool\configtool.bat (or .sh on unix)



Switch to Configuration Editor Mode

Click  button. This will bring you to the configuration editor mode of the config tool.



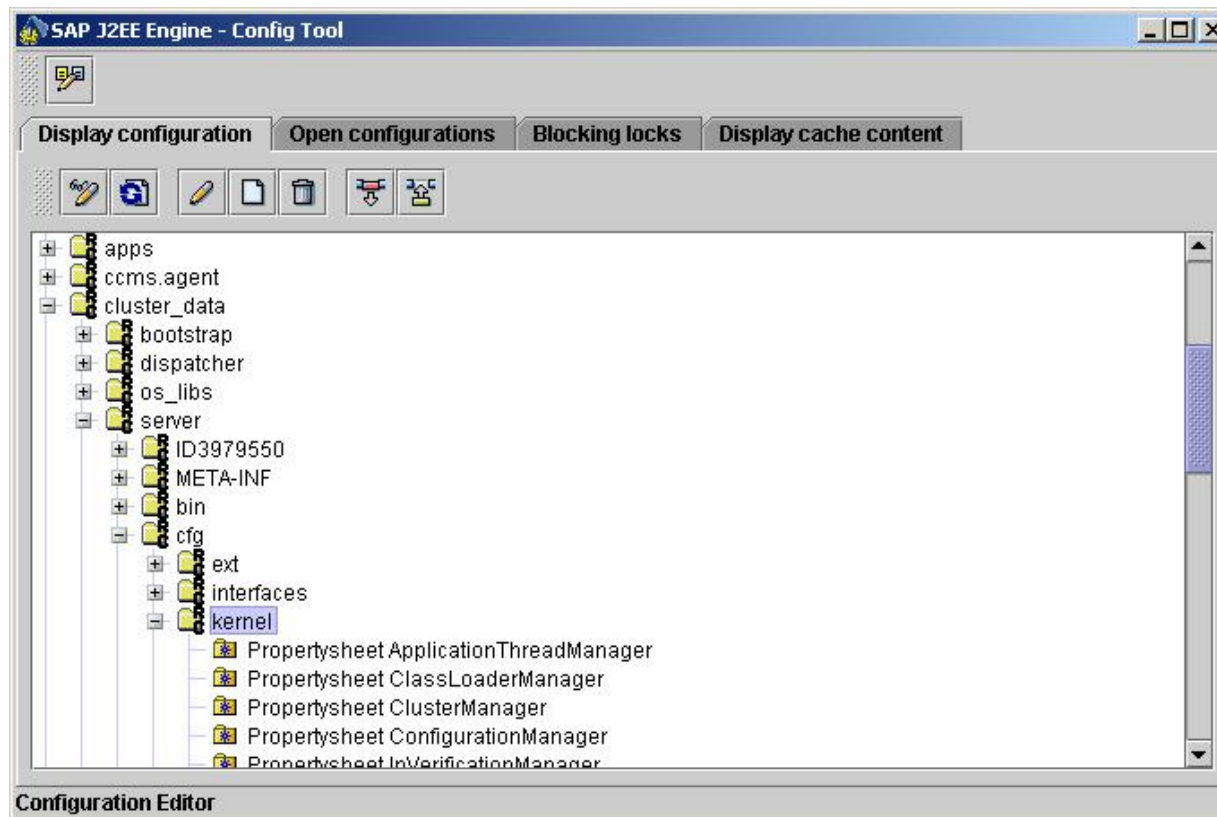
Locate the Log Configuration Properties

n In the configuration tree follow the following path:

n **cluster_data > server > cfg > kernel**

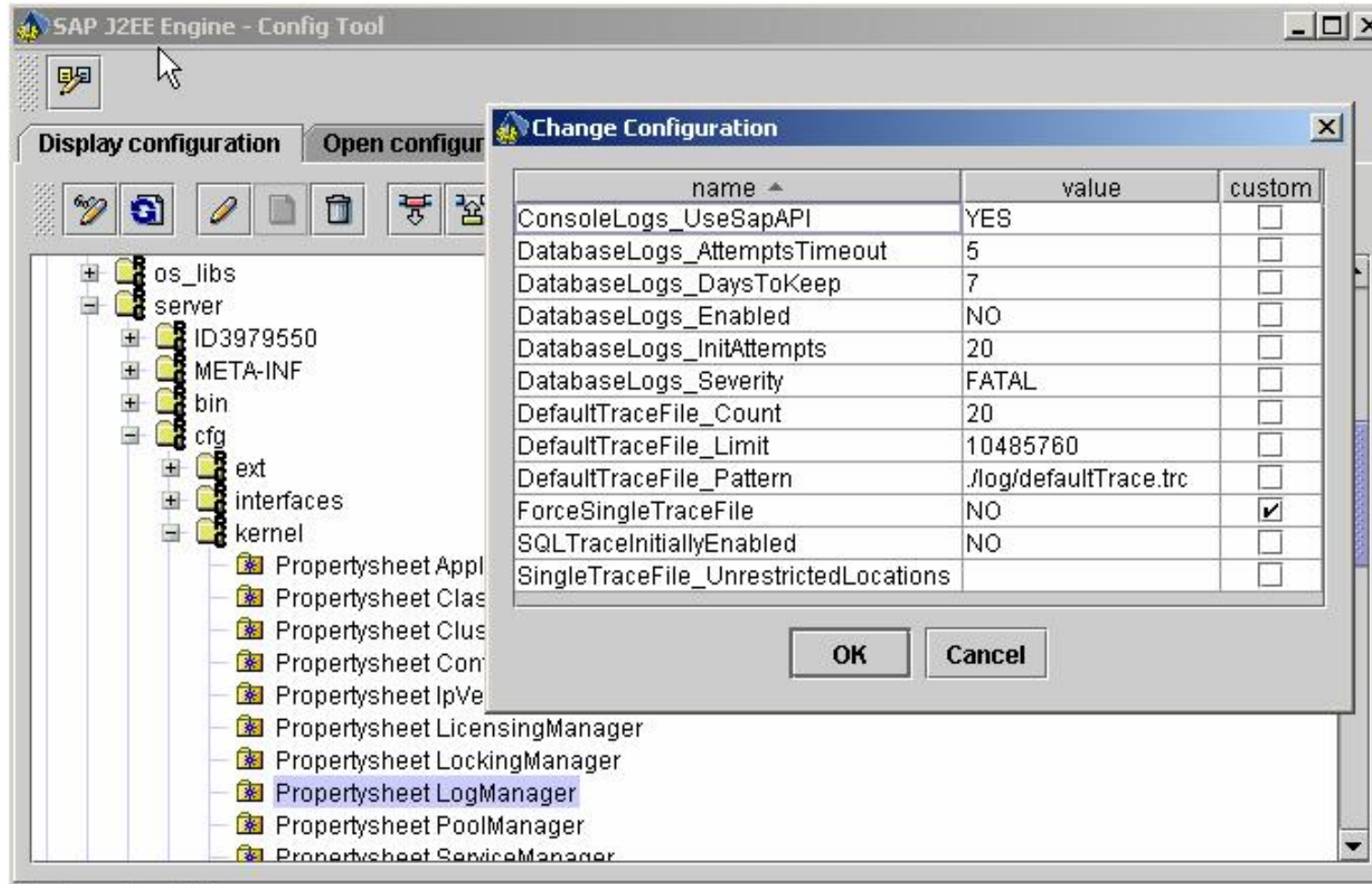
n Now switch to “edit” mode so you can make changes.

n Click the  button.



Open the Log Properties

- Double click on the node titled: **PropertySheet LogManager**
- This will allow you to change the Log properties.



Log Configuration Properties

- n **ForceSingleTraceFile** – by default this is set to YES, or left blank, which means all traces will go to the default trace file.
- n Set to “NO” – will enable multiple traces.

The image shows two overlapping dialog boxes from an SAP configuration tool. The 'Change property entry' dialog is in the background, showing the configuration for the property 'ForceSingleTraceFile'. The 'Name' field contains 'ForceSingleTraceFile', the 'Datatype' is 'java.lang.String', the 'Default' is 'YES', and the 'Custom' field contains 'NO'. The 'Apply custom' button is highlighted with a tooltip that reads 'Apply the specified custom v...'. The 'Display configuration' dialog is in the foreground, showing a table of configuration properties.

name ^	value	custom
ConsoleLogs_UseSapAPI	YES	<input type="checkbox"/>
DatabaseLogs_AttemptsTimeout	5	<input type="checkbox"/>
DatabaseLogs_DaysToKeep	7	<input type="checkbox"/>
DatabaseLogs_Enabled	NO	<input type="checkbox"/>
DatabaseLogs_InitAttempts	20	<input type="checkbox"/>
DatabaseLogs_Severity	FATAL	<input type="checkbox"/>
DefaultTraceFile_Count	20	<input type="checkbox"/>
DefaultTraceFile_Limit	10485760	<input type="checkbox"/>
DefaultTraceFile_Pattern	./log/defaultTrace.trc	<input type="checkbox"/>
ForceSingleTraceFile	NO	<input checked="" type="checkbox"/>
SQLTraceInitiallyEnabled	NO	<input type="checkbox"/>
SingleTraceFile_UnrestrictedLocations		<input type="checkbox"/>

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Some Definitions

Log Configurator Service

n Allows you to configure the logs and traces that are output.

Category

n Used for creating Logs, denote functional / technical area.

n Database, Security, Network, Performance

Location

n Used for creating traces, denotes application classes and packages of where traces occurred.

Destination

n Location of where the traces and logs will be written too.

n Can configure file size, number of files to keep, etc.

Log Configurator Service

n Set / Modify Destinations for categories and locations.

n Set / Modify log/trace level severities to print out.

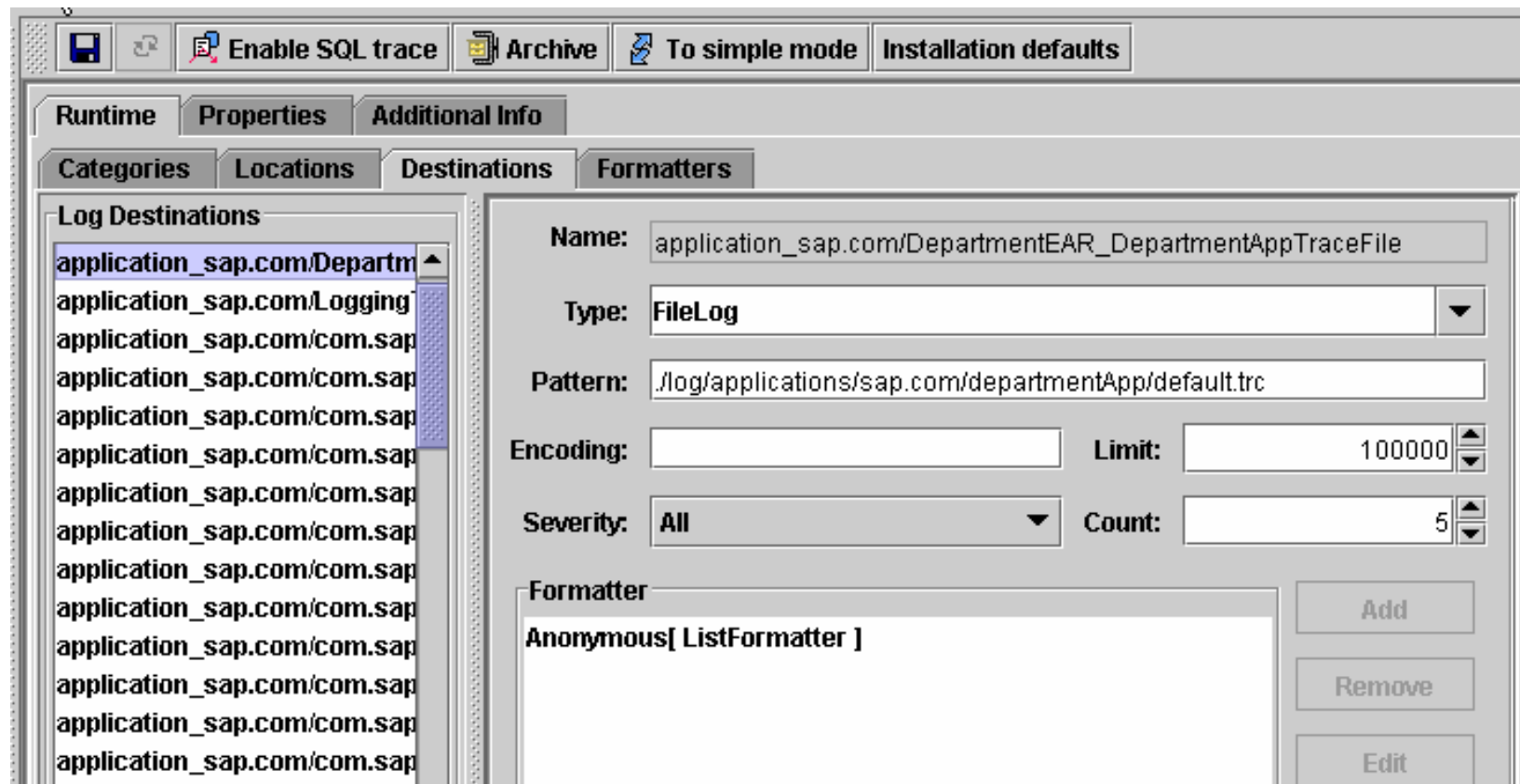
n Levels can be changed at runtime!

n Remember to click the save button after any changes!

The screenshot displays the SAP Log Configurator Service interface. At the top, there are buttons for 'Enable SQL trace', 'Archive', 'To simple mode', and 'Installation defaults'. Below these are tabs for 'Runtime', 'Properties', and 'Additional Info'. Under 'Runtime', there are sub-tabs for 'Categories', 'Locations', 'Destinations', and 'Formatters'. The 'Categories' tab is active, showing a tree view of 'Log Controllers'. The 'Database (Severity=Info)' category is selected. The right-hand pane shows the configuration for this category: 'Name: /System/Database', 'Bundle: [empty]', 'Min: Info', 'Max: Info', and 'Severity: Info'. Below this, there is a 'Relative controllers' section and a 'Destinations' section listing 'system_database_log' and 'system_database_console'.

Log Configurator Service - Destinations

- Define the location where logs/traces will be written out too.
- Are referenced by Locations and Categories.
- Can also define the format of the corresponding file.



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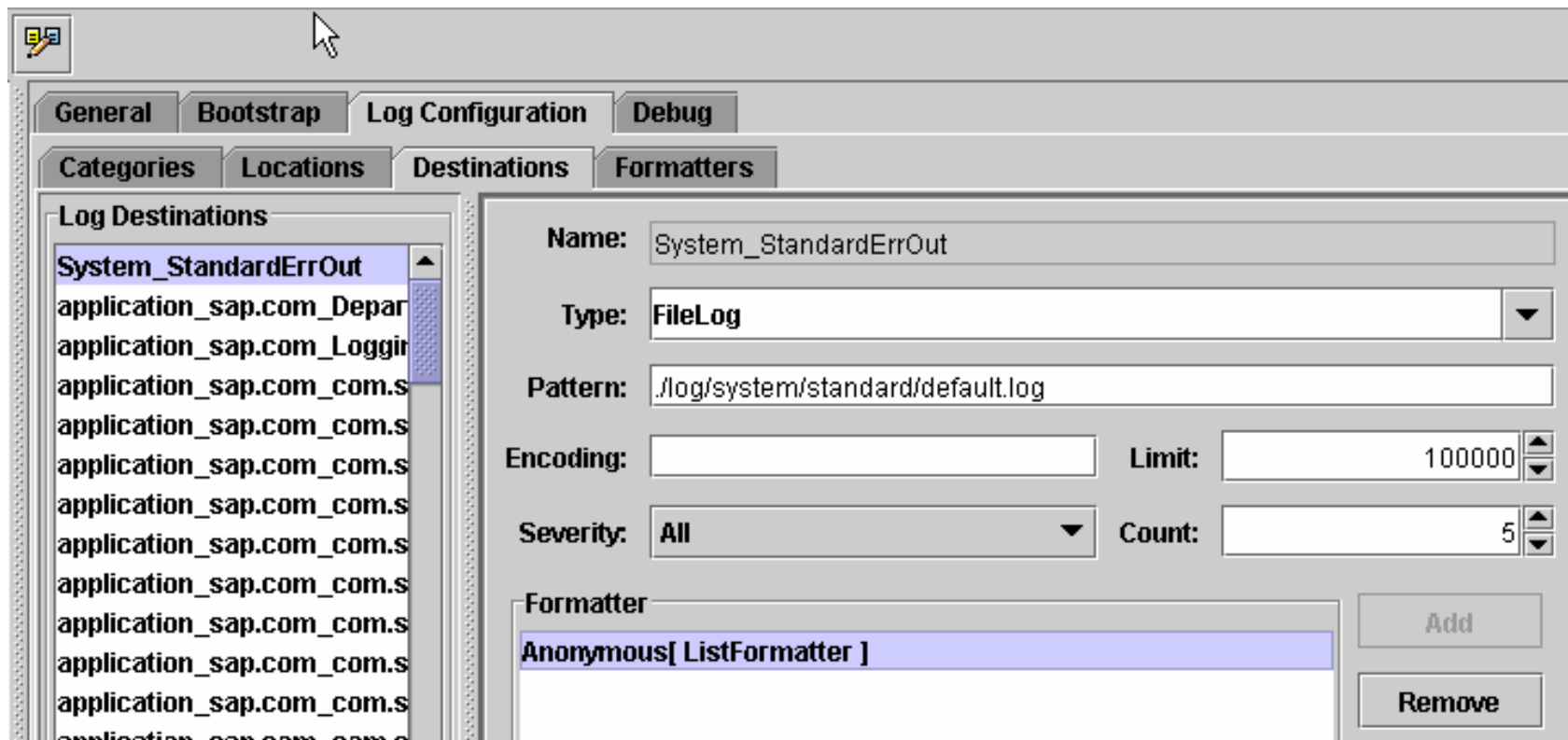
n **The Logging and Tracing API.**

Create a New Destination for Standard Output/Error

n Using the Config Tool, create a new destination.

n Go to the Destinations tab shown below and click the New button.

n Add the ListFormatter



Set Standard Out/Error Destination

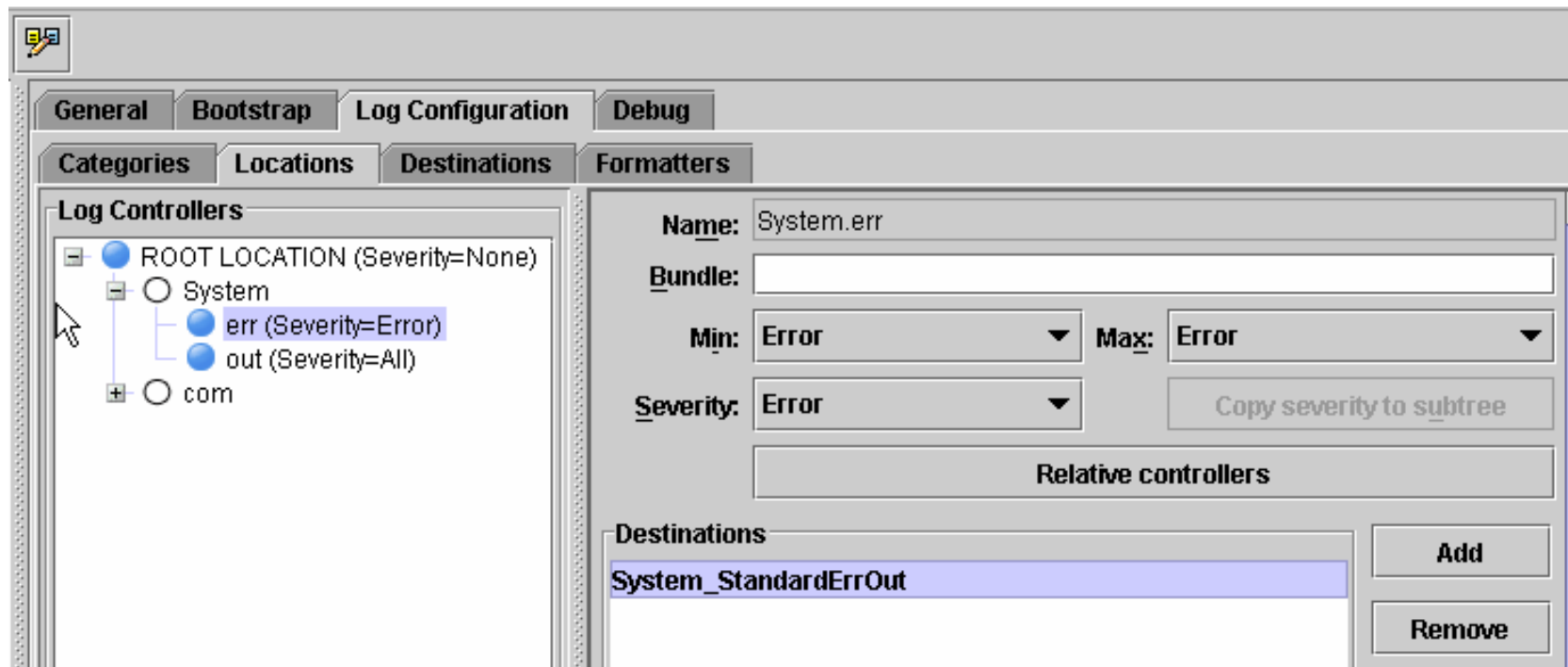
n In the Config Tool go to the Locations Tab.

n In the Location Tree highlight the “err” node: System > err.

n Set the destination to the one you just created.

n Do the same for System > out node.

n Set the System > out node severity to “ALL”;



The screenshot displays the SAP Config Tool interface for Log Configuration. The 'Locations' tab is active, showing a tree view of log controllers. The 'System' node is expanded, and the 'err' node (Severity=Error) is selected. The right-hand pane shows the configuration for 'System.err'. The 'Name' field is 'System.err', and the 'Bundle' field is empty. The 'Min' and 'Max' severity levels are both set to 'Error'. The 'Severity' field is also set to 'Error'. A 'Destinations' list at the bottom contains 'System_StandardErrOut', which is highlighted. The 'Add' and 'Remove' buttons are visible next to the destination list.

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Coding Example: Categories

Example for writing log messages:

```
public class Node {
    private static final Location loc =
        Location.getLocation(Node.class);

    private static final Category cat = Category.SYS_DATABASE;

    public void store() {
        try {
            // Write object data to database ...
            Category.SYS_DATABASE.infoT("Node {0} stored in
                database",
                new Object[]{this});
        }
        catch (FailedWriteException e) {
            cat.logThrowable(Severity.WARNING, loc, "store()",
                "Error storing node {0} in database.",
                new Object[] {this}, e
            );
            throw e;
        }
    }
}
```

Coding Example: Locations

Example for writing a trace message:

```
package com.sap.examples;

public class Node {
    private static final Location loc =
        Location.getLocation(Node.class);

    public void announce(Object o) {
        String method = "announce(java.lang.Object)";

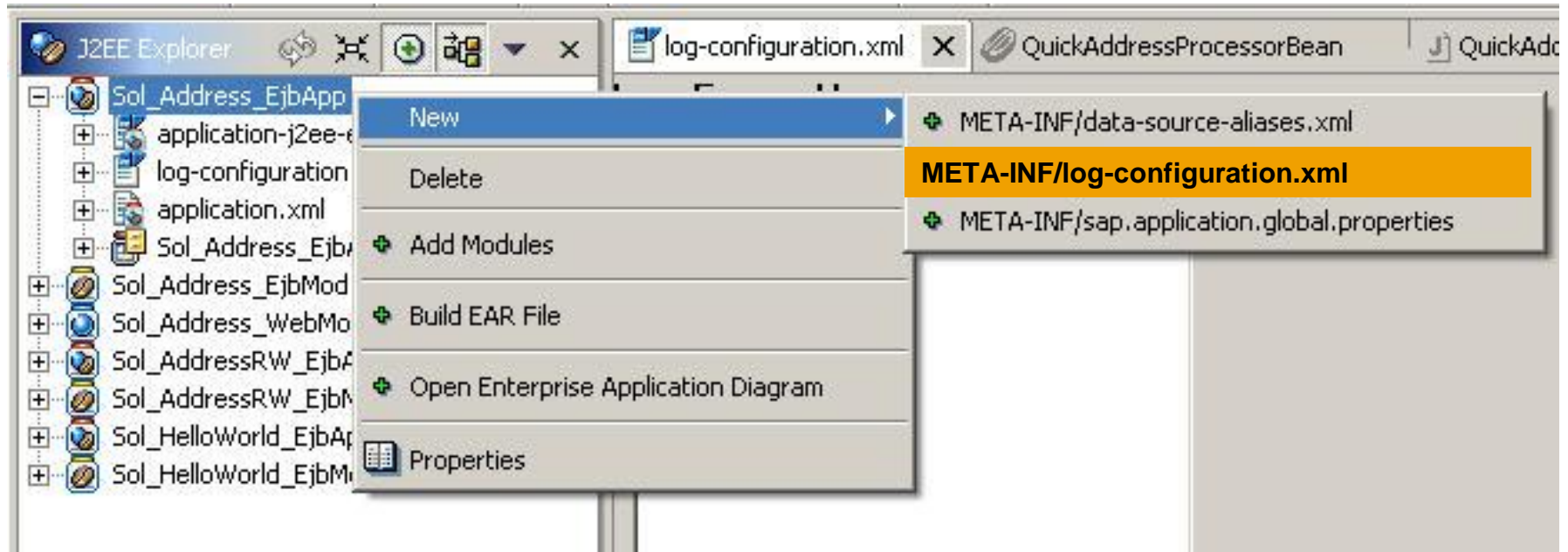
        loc.entering(method);

        //do something on Object o

        loc.debugT("Finished working on object {0}",
            Object[] {o});

        loc.exiting();
    }
}
```

Log Configuration: Create log-configuration.xml



Log Configuration: Log Formatter

The screenshot shows the 'Log Formatter' configuration window in SAP. The window title is 'log-configuration.xml'. On the left, a tree view shows a folder 'Log Formatters' containing a sub-entry 'DefaultFormatter'. On the right, the configuration fields for 'DefaultFormatter' are visible:

- Log Formatter Name:
- Log Formatter Pattern:
- Reference target type:

At the bottom left of the configuration area are 'Add' and 'Remove' buttons. At the bottom of the window, there are tabs for 'Log Formatter', 'Log Destination', 'Log Controller', and 'Source', with 'Log Formatter' currently selected.

Log Configuration: Log Destination

The screenshot shows the 'Log Destination' configuration window in SAP. The window title is 'log-configuration.xml'. On the left, a tree view shows 'Log Destinations' with 'AddressDestination' selected. The main area displays the configuration for 'AddressDestination':

- Destination name: AddressDestination
- Type: FileLog (indicated by an orange arrow)
- Pattern: ./Sol_Address_EjbApp/QuickAddress.log
- Encoding: (empty)
- Severity: ALL
- Limit: 10000
- Count: 5

The 'Formatter' section has three radio buttons: 'Without formatter', 'Formatter Reference' (selected), and 'Anonymous Formatter'. Below 'Formatter Reference' is a dropdown menu with 'DefaultFormatter' selected.

At the bottom left are 'Add' and 'Remove' buttons. At the bottom right are tabs for 'Log Formatter', 'Log Destination' (active), 'Log Controller', and 'Source'.

Log Configuration: Log controller

The screenshot displays the SAP Log Configuration tool interface. The window title is "log-configuration.xml". The main title is "Log Controller". On the left, a tree view shows the configuration structure: "Log Controllers" (expanded) contains "Applications/Sol_Address_EjbApp" (selected), which includes "Log Filters", "Associated Destinations", "Referenced Destinations", "AddressDestination", and "Anonymous Destinations". Below the tree are "Add" and "Remove" buttons. The right pane shows the configuration for the selected controller: "/Applications/Sol_Address_EjbApp". The fields are: "Controller name" (text box with "/Applications/Sol_Address_EjbApp"), "Bundle name" (empty text box), "Effective severity" (dropdown menu with "ALL"), "Minimum severity" (dropdown menu with "ALL"), "Maximum severity" (dropdown menu with "ALL"), "Relative Severity" section containing "Relative Severity Name" (empty text box) and "Relative Severity Value" (dropdown menu). At the bottom, a tabbed interface shows "Log Formatter", "Log Destination", "Log Controller" (active), and "Source".

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