# HP OpenView Performance Agent

## Data Source Integration Guide

**Edition: 9**

**for UNIX**

**Manufacturing Part Number: None**
**January 2003**

© Copyright 2003 Hewlett-Packard Company.

# Legal Notices

**Warranty.**

*Hewlett-Packard makes no warranty of any kind with regard to this manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be held liable for errors contained herein or direct, indirect, special, incidental or consequential damages in connection with the furnishing, performance, or use of this material.*

A copy of the specific warranty terms applicable to your Hewlett-Packard product can be obtained from your local Sales and Service Office.

**Restricted Rights Legend.**

Use, duplication or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause in DFARS 252.227-7013.

Hewlett-Packard Company
United States of America

Rights for non-DOD U.S. Government Departments and Agencies are as set forth in FAR 52.227-19(c)(1,2).

**Copyright Notices.**

©Copyright 1983-2003 Hewlett-Packard Company, all rights reserved.

No part of this document may be copied, reproduced, or translated to another language without the prior written consent of Hewlett-Packard Company. The information contained in this material is subject to change without notice.

**Trademark Notices.**

UNIX® is a registered trademark of The Open Group.

Adobe® and Acrobat® are registered trademarks of Adobe Systems Incorporated.

All other product names are the property of their respective trademark or service mark holders and are hereby acknowledged.

# Contents


**1. Overview of Data Source Integration**

Introduction . . . . . 16
How DSI Works . . . . . 17
Creating the Class Specification . . . . . 18
Collecting and Logging the Data . . . . . 18
Using the Data . . . . . 18

**2. Using Data Source Integration**

Introduction . . . . . 20
Planning Data Collection. . . . . 21
Defining the Log File Format . . . . . 22
How Log Files Are Organized . . . . . 23
Creating the Log File Set. . . . . 25
Testing the Class Specification File and the Logging Process (Optional) . . . . . 25
Logging Data to the Log File Set . . . . . 26
Using the Logged Data . . . . . 28

**3. DSI Class Specification Reference**

Introduction . . . . . 30
Class Specifications . . . . . 31
Class Specification Syntax. . . . . 32
CLASS Description . . . . . 33
CLASS . . . . . 34
LABEL. . . . . 35
INDEX BY, MAX INDEXES, AND ROLL BY . . . . . 36
Controlling Log File Size . . . . . 42
RECORDS PER HOUR . . . . . 44
CAPACITY . . . . . 46
Metrics Descriptions . . . . . 47
METRICS . . . . . 48
LABEL. . . . . 50
Summarization Method . . . . . 51
MAXIMUM . . . . . 52
PRECISION . . . . . 53
TYPE TEXT LENGTH . . . . . 54
Sample Class Specification . . . . . 55

**4. DSI Program Reference**

# Contents


Introduction . . . . . 58
sdlcomp Compiler . . . . . 59
Compiler Syntax . . . . . 60
Sample Compiler Output . . . . . 61
Configuration Files . . . . . 64
Defining Alarms for DSI Metrics . . . . . 64
Alarm Processing . . . . . 65
dsilog Logging Process . . . . . 66
How dsilog Processes Data . . . . . 69
Testing the Logging Process with Sdlgendata . . . . . 70
Creating a Format File . . . . . 73
Changing a Class Specification . . . . . 75
Exporting DSI Data . . . . . 76
Example of Using Extract to Export DSI Log File Data . . . . . 76
Viewing Data in OV Performance Manager . . . . . 77
Managing Data With sdlutil . . . . . 78
Syntax . . . . . 79

**5. Examples of Data Source Integration**

Introduction . . . . . 82
Writing a dsilog Script . . . . . 83
Logging vmstat Data . . . . . 85
Creating a Class Specification File . . . . . 85
Compiling the Class Specification File . . . . . 86
Starting the dsilog Logging Process . . . . . 86
Accessing the Data . . . . . 87
Logging sar Data from One File . . . . . 88
Creating a Class Specification File . . . . . 89
Compiling the Class Specification File . . . . . 90
Starting the DSI Logging Process . . . . . 91
Logging sar Data from Several Files . . . . . 93
Creating Class Specification Files . . . . . 93
Compiling the Class Specification Files . . . . . 98
Starting the DSI Logging Process . . . . . 98
Logging sar Data for Several Options . . . . . 100
Logging the Number of System Users . . . . . 107

**6. Error Messages**

DSI Error Messages . . . . . 110
SDL Error Messages . . . . . 111
DSILOG Error Messages . . . . . 130
General Error Messages . . . . . 134

# Contents

# Publication History

New editions are complete revisions of the manual. The printing dates for each edition are listed below. Beginning with Edition 5, the manual is no longer printed. It is published in Adobe Portable Document File (.pdf) format. No part number was assigned for Edition 5 and will not be assigned beginning with Edition 7.

| | | | |
|---|---|---|---|
| Edition 1 | July 1994 | 5962-7369 | E0794 |
| Edition 2 | November 1995 | B4967-90002 | E1195 |
| Edition 3 | August 1997 | B4967-90015 | E0897 |
| Edition 4 | October 1999 | B4967-90024 | E1099 |
| Edition 5 | July 2000 | | E0700 |
| Edition 6 | September 2001 | B4967-80048 | |
| Edition 7 | June 2002 | | |
| Edition 8 | December 2002 | | |
| Edition 9 | January 2003 | | |

# Conventions

The following typographical conventions are used in this manual.

**Table 1 Typographical Conventions**

| Font Type | What the Font Type Represents | Example |
|---|---|---|
| *Italic* | Book or manual titles, and man page names | Refer to the *HP OpenView Operations Administrator's Reference Volume I* and the *opc(1M)* manpage for more information. |
| | Provides emphasis | You *must* follow these steps. |
| | Specifies a variable that you must supply when entering a command | At the prompt type: `rlogin` *`your_name`* where you supply your login name. |
| | Parameters to a function | The *`oper_name`* parameter returns an integer response. |
| **Bold** | New terms | The **monitor agent** observes... |
| `Computer` | Text and items on the computer screen | The system replies: `Press Enter` |
| | Command names | Use the `grep` command ... |
| | Function names | Use the `opc_connect()`function to connect ... |
| | File and directory names | `/opt/OV/bin/` |
| | Process names | Check to see if `opcmona` is running. |
| | Window/dialog box names | In the `Add Logfile` window... |
| **`Computer Bold`** | Text that you must enter | At the prompt, type: **`ls -l`** |
| **Keycap** | Keyboard keys | Press **Return**. |
| `[Button]` | Buttons on the user interface. | Click `[Operator]`.<br>Click on the `[Apply]` button. |

**Table 1 Typographical Conventions (Continued) (Continued)**

| Font Type | What the Font Type Represents | Example |
|---|---|---|
| `Menu Items` | A menu name followed by a colon (:) means that you select the menu, then the item. When the item is followed by an arrow (->), a cascading menu follows. | Select `Actions:Utilities-> Reports`... |

# Support

Please visit the HP OpenView web site at:

http://openview.hp.com/

There you will find contact information and details about the products, services, and support that HP OpenView offers.

You can go directly to the HP OpenView eCare web site at:

http://support.openview.hp.com/

The eCare web site support area includes:

- Downloadable documentation
- Troubleshooting information
- Patches and updates
- Problem reporting
- Training information
- Support program information

# Revisions

The edition number on the title page of this document indicates the edition of this document. The print date on the title page changes each time this document is updated.

You will receive updated or new editions if you subscribe to the appropriate product support service. Contact your HP sales representative for details.

# 1 Overview of Data Source Integration

# Introduction

Data Source Integration (DSI) technology allows you to use OV Performance Agent to log data, define alarms, and access metrics from new sources of data beyond the metrics logged by the OV Performance Agent `scopeux` collector. Metrics can be acquired from data sources such as databases, LAN monitors, and end-user applications.

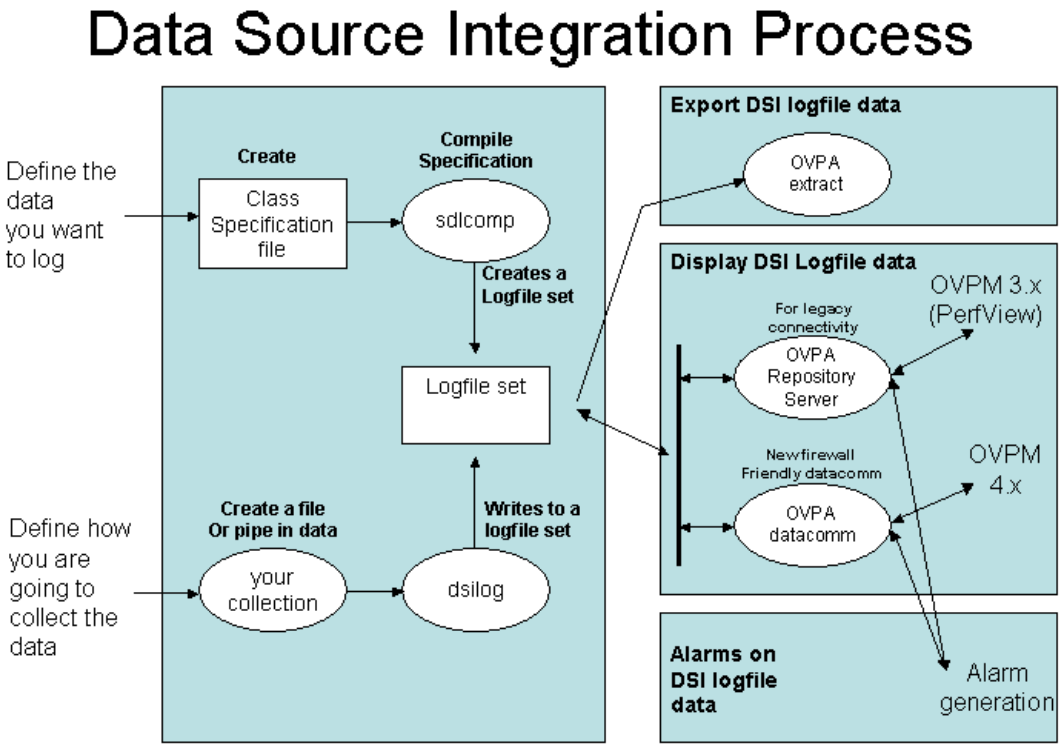
The data you log using DSI can be displayed in OV Performance Manager along with the standard performance metrics logged by the `scopeux` collector. DSI logged data can also be exported, using the OV Performance Agent `extract` program, for display in spreadsheets or similar analysis packages.

**NOTE** OV Performance Manager (OVPM) in this document refers to version 4.0 and beyond for UNIX and Windows platforms. OVPM 3.x (PerfView) will connect to OV Performance Agent 4.0 and beyond for all UNIX platforms except for OVPA for Linux. In the future, connectivity to OVPM 3.x will be discontinued.

## How DSI Works

The following diagram shows how DSI log files are created and used to log and manage data. DSI log files contain self-describing data that is collected outside of the OV Performance Agent scopeux collector. DSI processes are described in more detail on the next page.

**Figure 1-1 Data Source Integration Process**



Using DSI to log data consists of the following tasks.

## Creating the Class Specification

You first create and compile a specification for each class of data you want to log. The specification describes the class of data as well as the individual metrics to be logged within the class. When you compile the specification using the DSI compiler, `sdlcomp`, a set of empty log files are created to accept data from the `dsilog` program. This process creates the log file set that contains a root file, a description file, and one or more data files.

## Collecting and Logging the Data

Then you collect the data to be logged by starting up the process of interest. You can either pipe the output of the collection process to the `dsilog` program directly or from a file where the data was stored. `dsilog` processes the data according to the specification and writes it to the appropriate log file. `dsilog` allows you to specify the form and format of the incoming data.

The data that you feed into the DSI process should contain multiple data records. A record consists of the metric values contained in a single line. If you send data to DSI one record at a time, stop the process, and then send another record, `dsilog` can append but cannot summarize the data.

## Using the Data

You can use OV Performance Manager to display DSI log file data. Or you can use the OV Performance Agent `extract` program to export the data for use with other analysis tools. You can also configure alarms to occur when DSI metrics exceed defined conditions. For more information about exporting data and configuring alarms, see the *HP OpenView Performance Agent for UNIX User's Manual*.

# 2 Using Data Source Integration

# Introduction

This chapter is an overview of how you use DSI and contains the following information:

- ❑ Planning data collection
- ❑ Defining the log file format in the class specification file
- ❑ Creating the empty log file set
- ❑ Logging data to the log file set
- ❑ Using the logged data

For detailed reference information on DSI class specifications and DSI programs, see Chapter 3 and Chapter 4.

# Planning Data Collection

Before creating the DSI class specification files and starting the logging process, you need to address the following topics:

- ❏ Understand your environment well enough to know what kinds of data would be useful in managing your computing resources.
- ❏ What data is available?
- ❏ Where is the data?
- ❏ How can you collect the data?
- ❏ What are the delimiters between data items? For proper processing by `dsilog`, metric values in the input stream must be separated by blanks (the default) or a user-defined delimiter.
- ❏ What is the frequency of collection
- ❏ How much space is required to maintain logs?
- ❏ What is the output of the program or process that you use to access the data?
- ❏ Which alarms do you want generated and under what conditions?
- ❏ What options do you have for logging with the class specification and the `dsilog` process?

# Defining the Log File Format

Once you have a clear understanding of what kind of data you want to collect, create a class specification to define the data to be logged and to define the log file set that will contain the logged data. You enter the following information in the class specification:

- Data class name and ID number
- Label name (optional) that is a substitute for the class name. (For example, if a label name is present, it can be used in OV Performance Manager.)
- What you want to happen when old data is rolled out to make room for new data. See “How Log Files Are Organized” on page 23 for more information.
- Metric names and other descriptive information, such as how many decimals to allow for metric values.
- How you want the data summarized if you want to log a limited number of records per hour.

Here is an example of a class specification:

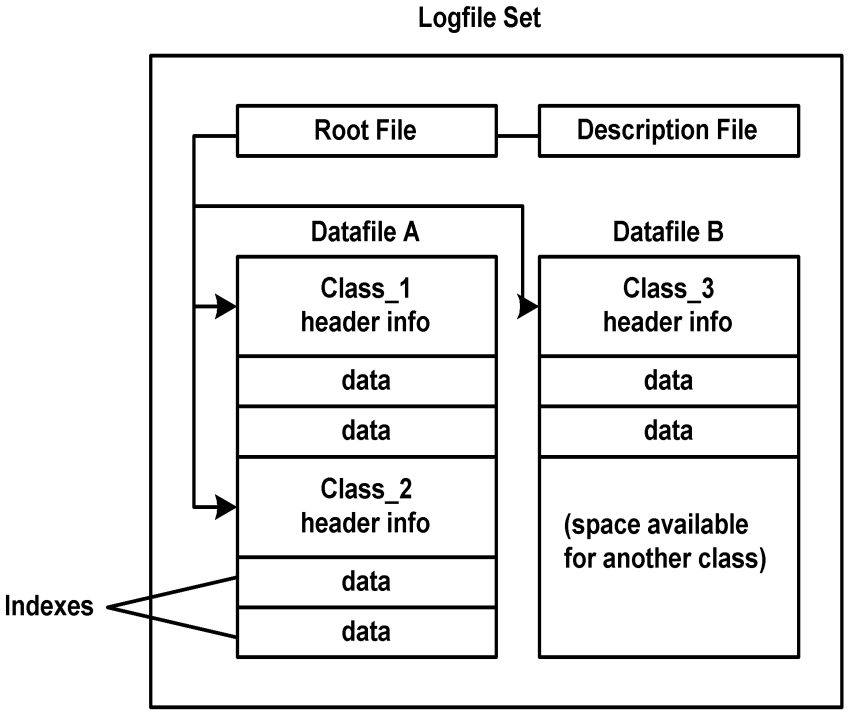
```
CLASS VMSTAT_STATS = 10001
LABEL "VMSTAT data"
INDEX BY HOUR
MAX INDEXES 12
ROLL BY HOUR
RECORDS PER HOUR 120;

METRICS
RUN_Q_PROCS    = 106
LABEL   "Procs in run q"
PRECISION 0;

BLOCKED_PROCS   = 107
LABEL   "Blocked Processes"
PRECISION 0;
```

You can include one class or multiple classes in a class specification file. When you have completed the class specification file, name the file and then save it. When you run the DSI compiler, sdlcomp, you use this file to create the log file set. For more information about class specification and metric description syntax, see Chapter 3.

## How Log Files Are Organized

Log files are organized into classes. Each class, which represents one source of incoming data, consists of a group of data items, or metrics, that are logged together. Each record, or row, of data in a class represents one sample of the values for that group of metrics.

The data for classes is stored on disk in log files that are part of the log file set. The log file set contains a root file, a description file, and one or more log files. All the data from a class is always kept in a single data file. However, when you provide a log file set name to the `sdlcomp` compiler, you can store multiple classes together in a single log file set or in separate log file sets. The figure below illustrates how two classes can be stored in a single log file set.



Because each class is created as a circular log file, you can set the storage capacity for each class separately, even if you have specified that multiple classes should be stored in a single log file set. When the storage capacity is reached, the class is “rolled”, which means the oldest records in the class are deleted to make room for new data.

You can specify actions, such as exporting the old data to an archive file, to be performed whenever the class is rolled.

# Creating the Log File Set

The DSI compiler, sdlcomp, uses the class specification file to create or update an empty log file set. The log file set is then used to receive logged data from the dsilog program.

To create a log file set, complete the following tasks:

1. Run sdlcomp with the appropriate variables and options. For example,

   ```
   sdlcomp [-maxclass value] specification_file
       [logfile_set[log file]] [options]
   ```

2. Check the output for errors and make changes as needed.

For more information about sdlcomp, see the "Compiler Syntax" section in Chapter 4.

## Testing the Class Specification File and the Logging Process (Optional)

DSI uses a program, sdlgendata, that allows you to test your class specification file against an incoming source of generated data. You can then examine the output of this process to verify that DSI can log the data according to your specifications. For more information about sdlgendata, see "Testing the Logging Process with Sdlgendata" in Chapter 4.

To test your class specification file for the logging process:

1. Feed the data that is generated by sdlgendata to the dsilog program. The syntax is:

   ```
   sdlgendata logfile_set.class -vo | dsilog logfile_set.class
   ```

2. Check the output to see if your class specification file matches the format of your data collection process. If the sdlgendata program outputs something different from your program, you have either an error in your output format or an error in the class specification file.

3. Before you begin collecting real data, delete all log files from the testing process.

# Logging Data to the Log File Set

After you have created the log file set, and optionally tested it, update OV Performance Agent configuration files as needed, and then run the `dsilog` program to log incoming data.

- ❏ Update the data source configuration file, `datasources`, to add the DSI log files as data sources for generating alarms or to view from an OV Performance Manager analysis system. For more information about `datasources`, see "Configuring Data Sources" in the *HP Openview Performance Agent Installation and Configuration Guide*.
- ❏ Modify the alarm definitions file, `alarmdef`, if you want to alarm on specific DSI metrics. For more information, see "Defining Alarms for DSI Metrics" in Chapter 4.
- ❏ Optionally, test the logging process by piping data (which may be generated by `sdlgendata` to match your class specification) to the `dsilog` program with the `-vi` option set.
- ❏ Check the data to be sure it is being correctly logged.
- ❏ After testing, remove the data that was tested.
- ❏ Start the collection process from the command line.
- ❏ Pipe the data from the collection process to `dsilog` (or some other way to get it to `stdin`) with the appropriate variables and options set. For example:

```
<program or process with variables>| dsilog logfile_set.class
```

**NOTE**

The `dsilog` program is designed to receive a continuous stream of data. Therefore, it is important to structure scripts so that `dsilog` receives continuous input data. Do not write scripts that create a new `dsilog` process for each new input data point. Doing so can cause duplicate timestamps to be written to the `dsilog` file, which can cause problems for OV Performance Manager and `perfalarm` when reading the file. See Chapter 5, Examples of Data Source Integration, for examples of problematic and recommended scripts

For more information about `dsilog` options, see “dsilog Logging Process” in Chapter 4.

# Using the Logged Data

Once you have created the DSI log files, you can export the data using the OV Performance Agent's `extract` program. You can also configure alarms to occur when DSI metrics exceed defined conditions.

Here are ways to use logged DSI data:

- ❏ Export the data for use in reporting tools such as spreadsheets.
- ❏ Display exported DSI data using analysis tools such as in OV Performance Manager.
- ❏ Monitor alarms using OV Performance Manager, OV Operations (OVO), or HP OpenView Network Node Manager.

**NOTE** You cannot create extracted log files from DSI log files.

For more information about exporting data and defining alarms, see the *HP OpenView Performance Agent for UNIX User's Manual*. For information about displaying DSI data in OV Performance Manager and monitoring alarms in OV Performance Manager, OVO, and Network Node Manager, see OV Performance Manager online Help.

# 3 DSI Class Specification Reference

# Introduction

This chapter provides detailed reference information about:

- Class specifications
- Class specifications syntax
- Metrics descriptions in the class specifications

# Class Specifications

For each source of incoming data, you must create a class specification file to describe the format for storing incoming data. To create the file, use the class specification language described in the next section, “Class Specification Syntax”. The class specification file contains:

- a class description, which assigns a name and numeric ID to the incoming data set, determines how much data will be stored, and specifies when to roll data to make room for new data.
- metric descriptions for each individual data item. A metric description names and describes a data item. It also specifies the summary level to apply to data (RECORDS PER HOUR) if more than one record arrives in the time interval that is configured for the class.

To generate the class specification file, use any editor or word processor that lets you save the file as an ASCII text file. You specify the name of the class specification file when you run `sdlcomp` to compile it. When the class specification is compiled, it automatically creates or updates a log file set for storage of the data.

The class specification allows you to determine how many records per hour will be stored for the class, and to specify a summarization method to be used if more records arrive than you want to store. For instance, if you have requested that 12 records per hour be stored (a record every five minutes) and records arrive every minute, you could have some of the data items averaged and others totaled to maintain a running count.

**NOTE**

The DSI compiler, `sdlcomp`, creates files with the following names for a log file set (named `logfile_set_name`):

`logfile_set_name` and `logfile_set_name.desc`

`sldcomp` creates a file with the following default name for a class (named *`class_name`*):

*`logfile_set_name.class_name`*

Avoid the use of class specification file names that conflict with these naming conventions, or `sdlcomp` will fail.

# Class Specification Syntax

Syntax statements shown in brackets [ ] are optional. Multiple statements shown in braces { } indicate that one of the statements must be chosen. Italicized words indicate a variable name or number you enter. Commas can be used to separate syntax statements for clarity anywhere except directly preceding the semicolon, which marks the end of the class specification and the end of each metric specification. Statements are not case-sensitive.

**NOTE** User-defined descriptions, such as *metric_label_name* or *class_label_name*, cannot be the same as any of the keyword elements of the DSI class specification syntax.

Comments start with # or //. Everything following a # or // on a line is ignored. Note the required semicolon after the class description and after each metric description. Detailed information about each part of the class specification and examples follow.

```
CLASS class_name = class_id_number
[LABEL "class_label_name"]

 [INDEX BY {HOUR | DAY | MONTH} MAX INDEXES number
 [[ROLL BY {HOUR | DAY | MONTH} [ACTION "action" ]

 [ CAPACITY {maximum_record_number} ]
[ RECORDS PER HOUR  number ]
;

METRICS

metric_name = metric_id_number
[ LABEL "metric_label_name" ]
[ TOTALED | AVERAGED | SUMMARIZED BY metric_name ]
 [ MAXIMUM  metric_maximum_number ]
[PRECISION {0 | 1 | 2 | 3 | 4 | 5} ]
[TYPE TEXT LENGTH "length"]
;
```

# CLASS Description

To create a class description, assign a name to a group of metrics from a specific data source, specify the capacity of the class, and designate how data in the class will be rolled when the capacity is exceeded.

You must begin the class description with the CLASS keyword. The final parameter in the class specification must be followed by a semicolon.

### Syntax

```
CLASS class_name = class_id_number

[LABEL "class_label_name"]


[INDEX BY { HOUR | DAY | MONTH } MAX INDEXES number
[[ ROLL BY { HOUR | DAY | MONTH } [ACTION "action"]


[ CAPACITY {maximum_record_number} ]

[ RECORDS PER HOUR number]
```

;

### Default Settings

The default settings for the class description are:

```
LABEL (class_name)
INDEX BY DAY
MAX INDEXES 9
RECORDS PER HOUR 12
```

To use the defaults, enter only the CLASS keyword with a *class_name* and numeric *class_id_number*.

## CLASS

The class name and class ID identify a group of metrics from a specific data source.

### Syntax

```
CLASS   class_name = class_id_number
```

### How to Use It

The *class_name* and *class_ID_number* must meet the following requirements:

- *class_name* is alphanumeric and can be up to 20 characters long. The name must start with an alphabetic character and can contain underscores (but no special characters).
- *class_ID_number* must be numeric and can be up to six digits long.
- Neither the *class_name* or the *class_ID_number* are case-sensitive.
- The *class_name* and *class_ID_number* must each be unique among all the classes you define and cannot be the same as any applications defined in the OV Performance Agent `parm` file. (For information about the `parm` file, see Chapter 2 of the *HP OpenView Performance Agent for UNIX User's Manual*.).

### Example

```
CLASS VMSTAT_STATS = 10001;
```

## LABEL

The class label identifies the class as a whole. It is used instead of the class name in OV Performance Manager.

### Syntax

```
[ LABEL   "class_label_name" ]
```

### How To Use It

The *class_label_name* must meet the following requirements:

- ❏ It must be enclosed in double quotation marks.
- ❏ It can be up to 48 characters long.
- ❏ It cannot be the same as any of the keyword elements of the DSI class specification syntax, such as `CAPACITY`, `ACTION` and so on.
- ❏ If it contains a double quotation mark, precede it with a backslash (`\`). For example, you would enter **`"\"my\" data"`** if the label is `"my" data`.
- ❏ If no label is specified, the *class_name* is used as the default.

### Example

```
CLASS VMSTAT_STATS = 10001

LABEL "VMSTAT data";
```

## INDEX BY, MAX INDEXES, AND ROLL BY

INDEX BY, MAX INDEXES, and ROLL BY settings allow you to specify how to store data and when to discard it. With these settings you designate the blocks of data to store, the maximum number of blocks to store, and the size of the block of data to discard when data reaches its maximum index value.

### Syntax

```
[INDEX BY {HOUR | DAY | MONTH} MAX INDEXES number]
[[ROLL BY {HOUR | DAY | MONTH} [ACTION "action"]]
```

### How To Use It

INDEX BY settings allow blocks of data to be rolled out of the class when the class capacity is reached. The INDEX BY and RECORDS PER HOUR options can be used to indirectly set the capacity of the class as described later in “Controlling Log File Size”.

The INDEX BY setting cannot exceed the ROLL BY setting. For example, INDEX BY DAY does not work with ROLL BY HOUR, but INDEX BY HOUR does work with ROLL BY DAY.

If ROLL BY is not specified, the INDEX BY setting is used. When the capacity is reached, all the records logged in the oldest roll interval are freed for reuse.

Any specified ACTION is performed before the data is discarded (rolled). This optional ACTION can be used to export the data to another location before it is removed from the class. For information about exporting data, see Chapter 4.

### Notes on Roll Actions

The UNIX command specified in the ACTION statement cannot be run in the background. Also, do not specify a command in the ACTION statement that will cause a long delay, because new data won’t be logged during the delay.

If the command is more than one line long, mark the start and end of each line with double quotation marks. Be sure to include spaces where necessary inside the quotation marks to ensure that the various command line options will remain separated when the lines are concatenated.

If the command contains a double quotation mark, precede it with a backslash (\).

The ACTION statement is limited to 199 characters or less.

Within the ACTION statement, you can use macros to define the time window of the data to be rolled out of the log file. These macros are expanded by dsilog. You can use $PT_START$ to specify the beginning of the block of data to be rolled out in UNIX time (seconds since 1/1/70 00:00:00) and $PT_END$ to specify the end of the data in UNIX time. These are particularly useful when combined with the extract program to export the data before it is overwritten.

If a macro is used, its expanded length is used against the 199-character limit.

**Examples**

The following examples may help to clarify the relationship between the INDEX BY, MAX INDEXES, and the ROLL BY clauses.

The following example indirectly sets the CAPACITY to 144 records (1*12*12).

```
CLASS VMSTAT_STATS = 10001
LABEL "VMSTAT data"
INDEX BY HOUR
MAX INDEXES 12
RECORDS PER HOUR 12;
```

The following example indirectly sets the CAPACITY to 1440 records (1*12*120).

```
CLASS VMSTAT_STATS = 10001
LABEL "VMSTAT data"
INDEX BY HOUR
MAX INDEXES  12
RECORDS PER HOUR  120;
```

The following example shows ROLL BY HOUR.

```
CLASS VMSTAT_STATS = 10001
LABEL  "VMSTAT data"
INDEX BY HOUR
MAX INDEXES  12
ROLL BY HOUR
RECORDS PER HOUR  120;
```

The following example causes all the data currently identified for rolling (excluding weekends) to be exported to a file called `sys.sdl` before the data is overwritten. Note that the last lines of the last example are enclosed in double quotation marks to indicate that they form a single command.

```
CLASS VMSTAT_STATS = 10001
LABEL  "VMSTAT data"
INDEX BY HOUR
MAX INDEXES  12
ROLL BY HOUR
ACTION "extract -xp -l sdl_new -C SYS_STATS "
"-B $PT_START$ -E $PT_END$ -f sys.sdl, purge -we 17 "
RECORDS PER HOUR  120;
```

### Other Examples

The suggested index settings below may help you to consider how much data you want to store.

| INDEX BY | MAX INDEXES | Amount of Data Stored |
|---|---|---|
| HOUR | 72 | 3 days |
| HOUR | 168 | 7 days |
| HOUR | 744 | 31 days |
| DAY | 365 | 1 year |
| MONTH | 12 | 1 year |

The following table provides a detailed explanation of settings using `ROLL BY`.

| INDEX BY | MAX INDEXES | Roll By | Meaning |
|---|---|---|---|
| DAY | 9 | DAY | Nine days of data will be stored in the log file. Before logging day 10, day 1 is rolled out. These are the default values for index and max indexes. |

| INDEX BY | MAX INDEXES | Roll By | Meaning |
|---|---|---|---|
| HOUR | 72 | HOUR | 72 hours (three days) of data will be stored in the log file. Before logging hour 73, hour 1 is rolled out. Thereafter, at the start of each succeeding hour, the “oldest” hour is rolled out. |
| HOUR | 168 | DAY | 168 hours (seven days) of data will be stored in the log file. Before logging hour 169 (day 8), day 1 is rolled out. Thereafter, at the start of each succeeding day, the “oldest” day is rolled out. |
| HOUR | 744 | MONTH | 744 hours (31 days) of data will be stored in the log file. Before logging hour 745 (day 32), month 1 is rolled out. Thereafter, before logging hour 745, the “oldest” month is rolled out.<br><br>For example, `dsilog` is started on April 15 and logs data through May 16 (744 hours). Before logging hour 745 (the first hour of May 17), `dsilog` will roll out the data for the month of April (April 15 - 30). |

| INDEX BY | MAX INDEXES | Roll By | Meaning |
|---|---|---|---|
| DAY | 30 | DAY | 30 days of data will be stored in the log file. Before logging day 31, day 1 is rolled out. Thereafter, at the start of each succeeding day, the “oldest” month is rolled out.<br><br>For example, `dsilog` is started on April 1 and logs data all month, then the April 1st will be rolled out when May 1st (day 31) data is to be logged. |
| DAY | 62 | MONTH | 62 days of data will be stored in the log file. Before logging day 63, month 1 is rolled out. Thereafter, before logging day 63 the “oldest” month is rolled out.<br><br>For example, if `dsilog` is started on March 1 and logs data for the months of March and April, there will be 61 days of data in the log file. Once dsilog logs May 1st data (the 62nd day), the log file will be full. Before dsilog can log the data for May 2nd, it will roll out the entire month of March. |

| INDEX BY | MAX INDEXES | Roll By | Meaning |
|---|---|---|---|
| MONTH | 2 | MONTH | Two months of data will be stored in the log file. Before logging the third month, month 1 is rolled out. Thereafter, at the start of each succeeding month, the "oldest" month is rolled out.<br><br>For example, `dsilog` is started on January 1 and logs data for the months of January and February. Before `dsilog` can log the data for March, it will roll out the month of January. |

# Controlling Log File Size

You determine how much data is to be stored in each class and how much data to discard to make room for new data.

Class capacity is calculated from INDEX BY (hour, day, or month), RECORDS PER HOUR, and MAX INDEXES. The following examples show the results of different settings.

In this example, the class capacity is 288 (24 indexes * 12 records per hour).

```
INDEX BY HOUR
MAX INDEXES 24
RECORDS PER HOUR 12
```

In this example, the class capacity is 504 (7 days * 24 hours per day * 3 records per hour).

```
INDEX BY DAY
MAX INDEXES 7
RECORDS PER HOUR 3
```

In this example, the class capacity is 14,880 (2 months * 31 days per month * 24 hours per day * 10 records per hour).

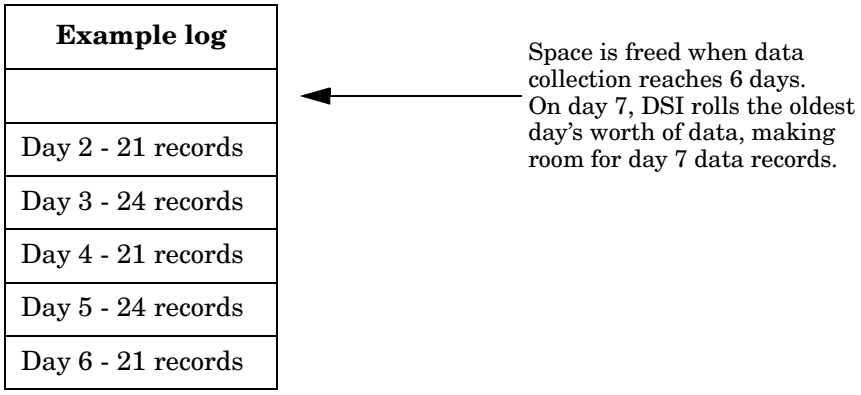
```
INDEX BY MONTH
MAX INDEXES 2
RECORDS PER HOUR 10
```

If you do not specify values for INDEX BY, RECORDS PER HOUR, and MAX INDEXES, DSI uses the defaults for the class descriptions. See “Default Settings” under “CLASS Description” earlier in this chapter.

The ROLL BY option lets you determine how much data to discard each time the class record capacity is reached. The setting for ROLL BY is constrained by the INDEX BY setting in that the ROLL BY unit (hour, day, month) cannot be smaller than the INDEX BY unit.

The following example illustrates how rolling occurs given the sample

```
INDEX BY DAY
MAX INDEXES 6
ROLL BY DAY
```




In the above example, the class capacity is limited to six days of data by the setting:

```
MAX INDEXES 6.
```

The deletion of data is set for a day's worth by the setting:

```
ROLL BY DAY.
```

When the seventh day's worth of data arrives, the oldest day's worth of data is discarded. Note that in the beginning of the logging process, no data is discarded. After the class fills up for the first time at the end of 7 days, the roll takes place once a day.

# RECORDS PER HOUR

The RECORDS PER HOUR setting determines how many records are written to the log file every hour. The default number for RECORDS PER HOUR is 12 to match OV Performance Agent's measurement interval of data sampling once every five minutes (60 minutes/12 records = logging every five minutes).

The default number or the number you enter could require the logging process to summarize data before it becomes part of the log file. The method used for summarizing each data item is specified in the metric description. For more information, see "Summarization Method" later in this chapter.

### Syntax

```
[RECORDS PER HOUR number]
```

### How To Use It

The logging process uses this value to summarize incoming data to produce the number of records specified. For example, if data arrives every minute and you have set RECORDS PER HOUR to 6 (every 10 minutes), 10 data points are summarized to write each record to the class. Some common RECORDS PER HOUR settings are shown below:

```
RECORDS PER HOUR 6 --> 1 record/10 minutes
RECORDS PER HOUR 12 --> 1 record/5 minutes
RECORDS PER HOUR 60 --> 1 record/minute
RECORDS PER HOUR 120 --> 1 record/30 seconds
```

### Notes

RECORDS PER HOUR can be overridden by the -s *seconds* option in dsilog. However, overriding the original setting could cause problems when OV Performance Manager graphs the data.

If dsilog receives no metric data for an entire logging interval, a missing data indicator is logged for that metric. DSI can be forced to use the last value logged with the -asyn option in dsilog. For a description of the -asyn option, see "dsilog Logging Process" in Chapter 4.

### Example

In this example, a record will be written every 10 minutes.

```
CLASS VMSTAT_STATS = 10001
LABEL  "VMSTAT data"
RECORDS PER HOUR  6;
```

# CAPACITY

CAPACITY is the number of records to be stored in the class.

### Syntax

```
[CAPACITY {maximum_record_number}]
```

### How To Use It

Class capacity is derived from the setting in RECORDS PER HOUR, INDEX BY, and MAX INDEXES. The CAPACITY setting is ignored unless a capacity larger than the derived values of these other settings is specified. If this situation occurs, the MAX INDEXES setting is increased to provide the specified capacity.

### Example

```
INDEX BY DAY
MAX INDEXES 9
RECORDS PER HOUR 12
CAPACITY 3000
```

In the above example, the derived class capacity is 2,592 records (9 days * 24 hours per day * 12 records per hour).

Because 3000 is greater than 2592, sdlcomp increases MAX INDEXES to 11, resulting in the class capacity of 3168. After compilation, you can see the resulting MAX INDEXES and CAPACITY values by running sdlutil with the -decomp option.

# Metrics Descriptions

The metrics descriptions in the class specification file are used to define the individual data items for the class. The metrics description equates a metric name with a numeric identifier and specifies the method to be used when data must be summarized because more records per hour are arriving than you have specified with the `RECORDS PER HOUR` setting.

**NOTE** User-defined descriptions, such as the *`metric_label_name`*, cannot be the same as any of the keyword elements of the DSI class specification syntax.

Note that there is a maximum limit of 100 metrics in the `dsilog` format file.

```
METRICS

metric_name = metric_id_number
[LABEL "metric_label_name"]
[TOTALED | AVERAGED | SUMMARIZED BY metric_name]
[MAXIMUM metric_maximum_number]
[PRECISION { 0 | 1 | 2 | 3 | 4 | 5 }]
TYPE TEXT LENGTH "length"
```

**NOTE** For numeric metrics, you can specify the summarization method (`TOTALED`, `AVERAGED`, `SUMMARIZED BY`), a `MAXIMUM` (for OVPM 3.x only), and `PRECISION`. For text metrics, you can only specify the `TYPE TEXT LENGTH`.

## METRICS

The metric name and id number identify the metric being collected.

### Syntax

```
METRICS
metric_name = metric_id_number
```

### How To Use It

The metrics section must start with the `METRICS` keyword before the first metric definition. Each metric must have a metric name that meets the following requirements:

- ❏ Must not be longer than 20 characters.
- ❏ Must begin with an alphabetic character.
- ❏ Can contain only alphanumeric characters and underscores.
- ❏ Is not case-sensitive.

The metric also has a metric ID number that must not be longer than 6 characters.

The *`metric_name`* and *`metric_id_number`* must each be unique among all the metrics you define in the class. The combination *`class_name:metric_name`* must be unique for this system, and it cannot be the same as any *`application_name:metric_name`*.

Each metric description is separated from the next by a semicolon (;).

You can reuse metric names from any other class whose data is stored in the same log file set if the definitions are identical as well (see "How Log Files Are Organized" in Chapter 2). To reuse a metric definition that has already been defined in another class in the same log file set, specify just the *`metric_name`* without the `metric_id_number` or any other specifications. If any of the options are to be set differently than the previously defined metric, the metric must be given a unique name and numeric identifier and redefined.

The order of the metric names in this section of the class specification determines the order of the fields when you export the logged data. If the order of incoming data is different than the order you list in this specification or if you do not want to log all the data in the incoming data stream, see Chapter 4 for information about how to map the metrics to the correct location.

A timestamp metric is automatically inserted as the first metric in each class. If you want the timestamp to appear in a different position in exported data, include the short form of the internally defined metric definition (DATE_TIME;) in the position you want it to appear. To omit the timestamp and use a UNIX timestamp (seconds since 1/1/70 00:00:00) that is part of the incoming data, choose the -timestamp option when starting the dsilog process.

The simplest metric description, which uses the metric name as the label and the defaults of AVERAGED, MAXIMUM 100, and PRECISION 3 decimal places, requires the following description:

```
METRICS
metric_name = metric_id_number
```

**NOTE** You must compile each class using sdlcomp and then start logging the data for that class using the dsilog process, regardless of whether you have reused metric names.

### Example

```
VM;
```

VM is an example of reusing a metric definition that has already been defined in another class in the same log file set.

## LABEL

The metric label identifies the metric in OV Performance Manager graphs and exported data.

### Syntax

```
[LABEL "metric_label_name"]
```

### How To Use It

Specify a text string, surrounded by double quotation marks, to label the metric in graphs and exported data. Up to 20 characters are allowed. If no label is specified, the metric name is used to identify the metric.

### Notes

If the label contains a double quotation mark, precede it with a backslash (\). For example, you would enter **"\"my\" data"** if the label is "my" data.

The *metric_label_name* cannot be the same as any of the keyword elements of the DSI class specification syntax such as CAPACITY, ACTION and so on.

### Example

```
METRICS
RUN_Q_PROCS  = 106
LABEL  "Procs in run q";
```

## Summarization Method

The summarization method determines how to summarize data if the number of records exceeds the number set in the RECORDS PER HOUR option of the CLASS section. For example, you would want to total a count of occurrences, but you would want to average a rate. The summarization method is only valid for numeric metrics.

### Syntax

```
[{TOTALED | AVERAGED | SUMMARIZED BY metric_name}]
```

### How To Use It

SUMMARIZED BY should be used when a metric is not being averaged over time, but over another metric in the class. For example, assume you have defined metrics TOTAL_ORDERS and LINES_PER_ORDER. If these metrics are given to the logging process every five minutes but records are being written only once each hour, to correctly summarize LINES_PER_ORDER to be (total lines / total orders), the logging process must perform the following calculation every five minutes:

- Multiply LINES_PER_ORDER * TOTAL_ORDERS at the end of each five-minute interval and maintain the result in an internal running count of total lines.
- Maintain the running count of TOTAL_ORDERS.
- At the end of the hour, divide total lines by TOTAL_ORDERS.

To specify this kind of calculation, you would specify LINES_PER_ORDER as SUMMARIZED BY TOTAL_ORDERS.

If no summarization method is specified, the metric defaults to AVERAGED.

### Example

```
METRICS
ITEM_1_3 = 11203
LABEL    "TOTAL_ORDERS"
TOTALED;
ITEM_1_5   = 11205
LABEL   "LINES_PER_ORDER"
SUMMARIZED BY ITEM_1_3;
```

## MAXIMUM

The metric maximum value for OVPM 3.x only, identifies how large the number might be. It is only valid for numeric metrics. It is meant to be used for estimating a maximum value range for graphing the metric in OVPM 3.x.

### Syntax

```
[MAXIMUM metric_maximum_number]
```

### How To Use It

Specify the expected maximum value for any metric. This value does not specify the largest acceptable number for logged data. (See the table in the following section for the largest acceptable numbers according to precision settings.)

The `MAXIMUM` setting is primarily used to estimate graphing ranges in the analysis software about the initial size of a graph containing the metric and to determine a precision if `PRECISION` is not specified. The default is 100. Zero is always used as the minimum value because the kinds of numbers expected to be logged are counts, average counts, rates, and percentages.

### Example

```
METRICS
RUN_Q_PROCS       = 106
LABEL     "Procs in run q"
MAXIMUM 50;
```

## PRECISION

PRECISION identifies the number of decimal places to be used for metric values. If PRECISION is not specified, it is calculated based on the MAXIMUM specified. If neither is specified, the default PRECISION value is 3. This setting is valid only for numeric metrics.

### Syntax

```
[PRECISION{0|1|2|3|4|5}]
```

### How To Use It

The PRECISION setting determines the largest value that can be logged. Use PRECISION 0 for whole numbers.

| PRECISION | # of Decimal Places | Largest Acceptable Numbers | MAXIMUM |
|---|---|---|---|
| 0 | 0 | 2,147,483,647 | > 10,000 |
| 1 | 1 | 214,748,364.7 | 1001 to 10,000 |
| 2 | 2 | 21,474,836.47 | 101 to 1,000 |
| 3 | 3 | 2,147,483.647 | 11 to 1,000 |
| 4 | 4 | 214,748.3647 | 2 to 10 |
| 5 | 5 | 21,474.83647 | 1 |

### Example

```
METRICS
RUN_Q_PROCS       = 106
LABEL     "Procs in run q"
PRECISION 1;
```

## TYPE TEXT LENGTH

The three keywords `TYPE TEXT LENGTH` specify that the metric is textual rather than numeric. Text is defined as any character other than `^d`, `\n`, or the separator, if any.

Because the default delimiter between data items for `dsilog` input is blank space, you will need to change the delimiter if the text contains embedded spaces. Use the `dsilog -c` char option to specify a different separator as described in Chapter 4.

### Syntax

```
[TYPE TEXT LENGTH length]
```

### How To Use It

The *length* must be greater than zero and less than 256.

### Notes

Summarization method, `MAXIMUM`, and `PRECISION` cannot be specified with text metrics. Text cannot be summarized, which means that `dsilog` will take the first logged value in an interval and ignore the rest.

### Example

```
METRICS
text_1 = 16
LABEL "first text metric"
TYPE TEXT LENGTH 20
;
```

# Sample Class Specification

```
CLASS VMSTAT_STATS = 10001
LABEL  "VMSTAT data"
INDEX BY HOUR
MAX INDEXES  12
ROLL BY HOUR
RECORDS PER HOUR  120;


METRICS

RUN_Q_PROCS       = 106
LABEL     "Procs in run q"
PRECISION 0;

BLOCKED_PROCS     = 107
LABEL     "Blocked Processes"
PRECISION 0;

SWAPPED_PROCS     = 108
LABEL     "Swapped Processes"
PRECISION 0;

AVG_VIRT_PAGES    = 201
LABEL     "Avg Virt Mem Pages"
PRECISION 0;

FREE_LIST_SIZE    = 202
LABEL     "Mem Free List Size"
PRECISION 0;

PAGE_RECLAIMS     = 303
LABEL     "Page Reclaims"
PRECISION 0;


ADDR_TRANS_FAULTS = 304
LABEL     "Addr Trans Faults"
PRECISION 0;

PAGES_PAGED_IN    = 305
LABEL     "Pages Paged In"
PRECISION 0;



PAGES_PAGED_OUT   = 306
```

```
LABEL     "Pages Paged Out"
PRECISION 0;

PAGES_FREED       = 307
LABEL     "Pages Freed/Sec"
PRECISION 0;

MEM_SHORTFALL     = 308
LABEL     "Exp Mem Shortfall"
PRECISION 0;

CLOCKED_PAGES     = 309
LABEL     "Pages Scanned/Sec"
PRECISION 0;

DEVICE_INTERRUPTS = 401
LABEL     "Device Interrupts"
PRECISION 0;

SYSTEM_CALLS      = 402
LABEL     "System Calls"
PRECISION 0;

CONTEXT_SWITCHES  = 403
LABEL     "Context Switches/Sec"
PRECISION 0;

USER_CPU          = 501
LABEL     "User CPU"
PRECISION 0;

SYSTEM_CPU        = 502
LABEL     "System CPU"
PRECISION 0;

IDLE_CPU          = 503
LABEL     "Idle CPU"
PRECISION 0;
```

# 4 DSI Program Reference

# Introduction

This chapter provides detailed reference information about:

- the `sdlcomp` compiler
- configuration files `datasources` and `alarmdef`
- the `dsilog` logging process
- exporting DSI data using the OV Performance Agent `extract` program
- the `sdlutil` data source management utility

# sdlcomp Compiler

The `sdlcomp` compiler checks the class specification file for errors. If no errors are found, it adds the class and metric descriptions to the description file in the log file set you name. It also sets up the pointers in the log file set's root file to the log file to be used for data storage. If either the log file set or the log file does not exist, it is created by the compiler.

**NOTE**

You can put the DSI files anywhere on your system by specifying a full path in the compiler command. However, once the path has been specified, DSI log files *cannot* be moved to different directories. (SDL62 is the associated class specification error message, described in “SDL Error Messages” in Chapter 6. The format used by DSI for the class specification error messages is the prefix `SDL` (Self Describing Logfile), followed by the message number.

## Compiler Syntax

```
sdlcomp [-maxclass value] specification_file
   [logfile_set[log file]] [options]
```

| Variables and Options | Definitions |
|---|---|
| `-maxclass` *value* | allows you to specify the maximum number of classes to be provided for when creating a new log file set. This option is ignored if it is used with the name of an existing log file set. Each additional class consumes about 500 bytes of disk space in overhead, whether the class is used or not. The default is 10 if `-maxclass` is not specified. |
| *specification_file* | is the name of the file that contains the class specification. If it is not in the current directory, it must be fully qualified. |
| *logfile_set* | is the name of the log file set this class should be added to. If the *logfile_set* does not exist, it will be created. If the *logfile_set* name is not fully qualified, it is assumed to be in the current directory. You can keep log file sets anywhere you choose.<br><br>If no log file set is named, compilation errors are written to `stderr` and no log file set is created. Compile without a log file set name first to check for compilation errors before actually creating the log file set. You can redirect `stderr` to a file for later viewing. Class and metric names and numeric IDs that have been previously used in the log file set will not cause compilation errors until you run `sdlcomp` with the log file set option. |
| *log file* | is the log file in the set that will contain the data for this class. If no log file is named, a new log file is created for the class and is named automatically. |

| Variables and Options | Definitions |
|---|---|
| -verbose | prints a detailed description of the compiler output to stdout. |
| -vers | displays version information. |
| -? | displays the syntax description. |

## Sample Compiler Output

Given the following command line:

```
->sdlcomp vmstat.spec sdl_new
```

the following code is sample output for a successful compile. Note that vmstat.spec is the sample specification file presented in the previous chapter.

```
sdlcomp
Check class specification syntax.

CLASS VMSTAT_STATS = 10001
LABEL  "VMSTAT data"
INDEX BY HOUR
MAX INDEXES  12
ROLL BY HOUR
RECORDS PER HOUR  120;

METRICS

RUN_Q_PROCS       = 106
LABEL     "Procs in run q"
PRECISION 0;

BLOCKED_PROCS     = 107
LABEL     "Blocked Processes"
PRECISION 0;

SWAPPED_PROCS     = 108
LABEL     "Swapped Processes"
PRECISION 0;

AVG_VIRT_PAGES    = 201
```

```
LABEL     "Avg Virt Mem Pages"
PRECISION 0;

FREE_LIST_SIZE    = 202
LABEL     "Mem Free List Size"
PRECISION 0;

PAGE_RECLAIMS     = 303
LABEL     "Page Reclaims"
PRECISION 0;
ADDR_TRANS_FAULTS = 304
LABEL     "Addr Trans Faults"
PRECISION 0;

PAGES_PAGED_IN    = 305
LABEL     "Pages Paged In"
PRECISION 0;

PAGES_PAGED_OUT   = 306
LABEL     "Pages Paged Out"
PRECISION 0;

PAGES_FREED       = 307
LABEL     "Pages Freed/Sec"
PRECISION 0;

MEM_SHORTFALL     = 308
LABEL     "Exp Mem Shortfall"
PRECISION 0;

CLOCKED_PAGES     = 309
LABEL     "Pages Scanned/Sec"
PRECISION 0;

DEVICE_INTERRUPTS = 401
LABEL     "Device Interrupts"
PRECISION 0;

SYSTEM_CALLS      = 402
LABEL     "System Calls"
PRECISION 0;

CONTEXT_SWITCHES  = 403
LABEL     "Context Switches/Sec"
PRECISION 0;
```

```
USER_CPU          = 501
LABEL     "User CPU"
PRECISION 0;

SYSTEM_CPU        = 502
LABEL     "System CPU"
PRECISION 0;

IDLE_CPU          = 503
LABEL     "Idle CPU"
PRECISION 0;
Note:  Time stamp inserted as first metric by default.

Syntax check successful.

Update SDL sdl_new.
Open SDL sdl_new
Add class VMSTAT_STATS.
Check class VMSTAT_STATS.

Class VMSTAT_STATS successfully added to log file set.
```

For explanations of error messages and recovery, see Chapter 6.

# Configuration Files

Before you start logging data, you may need to update two OV Performance Agent configuration files:

- `/var/opt/OV/conf/perf/datasources` — see "Configuring Data Sources" in the *HP Openview Performance Agent Installation and Configuration Guide* for detailed information about using and updating the `datasources` configuration file.
- `/var/opt/perf/alarmdef` — see the next section, "Defining Alarms for DSI Metrics" for information about using the `alarmdef` configuration file.

## Defining Alarms for DSI Metrics

You can use OV Performance Agent to define alarms on DSI metrics. These alarms notify you when DSI metrics meet or exceed conditions that you have defined. To define alarms, you specify conditions that, when met or exceeded, trigger an alert notification or action. You define alarms for data logged through DSI the same way as for other OV Performance Agent metrics — in the `alarmdef` file on the OV Performance Agent system. The `alarmdef` file is located in the `var/opt/perf/` configuration directory of OV Performance Agent.

Whenever you specify a DSI metric name in an alarm definition, it should be fully qualified; that is, preceded by the *`datasource_name`*, and the *`class_name`* as shown below:

*`datasource_name:class_name:metric_name`*

- *`datasource_name`* is the name you have used to configure the data source in the `datasources` file. See "Configuring Data Sources" in the *HP Openview Performance Agent Installation and Configuration Guide* for more information.
- *`class_name`* is the name you have used to identify the class in the class specification for the data source. You do not need to enter the *`class_name`* if the metric name is unique (not reused) in the class specification.
- *`metric_name`* is the data item from the class specification for the data source.

However, if you choose not to fully qualify a metric name, you need to include the USE statement in the `alarmdef` file to identify which data source to use. For more information about the USE statement, see Chapter 7, “Performance Alarms,” in the *HP OpenView Performance Agent for UNIX User's Manual*.

To activate the changes you made to the `alarmdef` file so that it can be read by the alarm generator, enter the `ovpa restart alarm` command in the command line.

For detailed information on the alarm definition syntax, how alarms are processed, and customizing alarm definitions, see Chapter 7 in the *HP OpenView Performance Agent for UNIX User's Manual*.

## Alarm Processing

As data is logged by **dsilog** it is compared to the alarm definitions in the `alarmdef` file to determine if a condition is met or exceeded. When this occurs, an alert notification or action is triggered.

You can configure where you want alarm notifications sent and whether you want local actions performed. Alarm notifications can be sent to the central OV Performance Manager analysis system where you can draw graphs of metrics that characterize your system performance. SNMP traps can be sent to HP OpenView Network Node Manager. Local actions can be performed on the OV Performance Agent system. Alarm information can also be sent to OV Operations.

# dsilog Logging Process

The dsilog process requires that either devise your own program or use one that is already in existence for you to gain access to the data. You can then pipe this data into dsilog, which logs the data into the log file set. A separate logging process must be used for each class you define.

dsilog expects to receive data from stdin. To start the logging process, you could pipe the output of the process you are using to collect data to dsilog as shown in the following example.

```
vmstat 60 | dsilog logfile_set class
```

You can only have one pipe ( | ) in the command line. This is because with two pipes, UNIX buffering will hold up the output from the first command until 8000 characters have been written before continuing to the second command and piping out to the log file.

You could also use a fifo (named pipe). For example,

```
mkfifo -m 777 myfifo
dsilog logfile_set class -i myfifo &
vmstat 60 > myfifo &
```

The & causes the process to run in the background.

Note that you may need to increase the values of the UNIX kernel parameters shmmni and nflocks if you are planning to run a large number of dsilog processes. Shmmni specifies the maximum number of shared memory segments; nflocks specifies the maximum number of file locks on a system. The default value for each is 200. Each active DSI log file set uses a shared memory segment (shmmni) and one or more file locks (nflocks). On HP-UX, you can change the settings for shmmni and nflocks using the System Administration and Maintenance utility (SAM).

**Syntax**

```
dsilog  logfile_set class [options]
```

The dsilog parameters and options are described on the following pages.

| Variables and Options | Definitions |
|---|---|
| *logfile_set* | is the name of the log file set where the data is to be stored. If it is not in the current directory, the name must be fully qualified. |
| *class* | is the name of the class to be logged. |
| -asyn | specifies that the data will arrive asynchronously with the RECORDS PER HOUR rate. If no data arrives during a logging interval, the data for the last logging interval is repeated. However, if dsilog has logged no data yet, the metric value logged is treated as missing data. This causes a flat line to be drawn in a graphical display of the data and causes data to be repeated in each record if the data is exported. |
| -c *char* | uses the specified character as a string delimiter/separator. You may not use the following as separators: decimal, minus sign, ^z, \n. If there are embedded spaces in any text metrics then you must specify a unique separator using this option. |
| -f *format file* | names a file that describes the data that will be input to the logging process. If this option is not specified, dsilog derives the format of the input from the class specification with the following assumptions. See "Creating a Format File" later in this chapter for more information.<br>❏ Each data item in an input record corresponds to a metric that has been defined in the class specification.<br>❏ The metrics are defined in the class specification in the order in which they appear as data items in the input record.<br>❏ If there are more data items in an input record than there are metric definitions, dsilog ignores all additional data items. |

| Variables and Options | Definitions |
|---|---|
| `-f format file` *(continued)* | ❑ If the class specification lists more metric definitions than there are input data items, the field will show "missing" data when the data is exported, and no data will be available for that metric when graphing data in the analysis software.<br>❑ The number of fields in the format file is limited to 100. |
| -i `fifo` or ASCII file | indicates that the input should come from the fifo or ASCII file named. If this option is not used, input comes from `stdin`. If you use this method, start `dsilog` before starting your collection process. See man page `mkfifo` for more information about using a `fifo`. Also see Chapter 5 for examples. |
| `-s seconds` | is the number of seconds by which to summarize the data. The `-s` option overrides the summarization interval and the summarization rate defaults to `RECORDS PER HOUR` in the class specification. If present, this option overrides the value of `RECORDS PER HOUR`.<br><br>A zero (`0`) turns off summarization, which means that all incoming data is logged. Caution should be used with the `-s 0` option because dsilog will timestamp the log data at the time the point arrived. This can cause problems for OV Performance Manager and perfalarm, which work best with timestamps at regular intervals. If the log file will be accessed by OV Performance Manager or the OV Performance perfalarm program, use of the `-s 0` option is discouraged. |
| `-t` | prints everything that is logged to `stdout` in ASCII format. |

| Variables and Options | Definitions |
|---|---|
| `-timestamp` | indicates that the logging process should not provide the timestamp, but use the one already provided in the input data. The timestamp in the incoming data must be in UNIX timestamp format (seconds since 1/1/70 00:00:00) and represent the local time. |
| `-vi` | filters the input through `dsilog` and writes errors to `stdout` instead of the log file. It does not write the actual data logged to `stdout` (see the `-vo` option below). This can be used to check the validity of the input. |
| `-vo` | filters the input through `dsilog` and writes the actual data logged and errors to `stdout` instead of the log file. This can be used to check the validity of the data summarization. |
| `-vers` | displays version information |
| `-?` | displays the syntax description. |

## How dsilog Processes Data

The `dsilog` program scans each input data string, parsing delimited fields into individual numeric or text metrics. A key rule for predicting how the data will be processed is the validity of the input string. A valid input string requires that a delimiter be present between any specified metric types (numeric or text). A blank is the default delimiter, but a different delimiter can be specified with the `dsilog -c char` command line option.

You *must* include a new line character at the end of any record fed to DSI in order for DSI to interpret it properly.

## Testing the Logging Process with Sdlgendata

Before you begin logging data, you can test the compiled log file set and the logging process using the `sdlgendata` program. `sdlgendata` discovers the metrics for a class (as described in the class specification) and generates data for each metric in a class.

**Syntax**

```
sdlgendata logfile_set class [options]
```

`Sdlgendata` parameters and options are explained below.

| Variables and Options | Definitions |
|---|---|
| *logfile_set* | is the name of the log file set to generate data for. |
| *class* | is the data class to generate data for. |
| `-timestamp` [*number*] | provides a timestamp with the data. If a negative number or no number is supplied, the current time is used for the timestamp. If a positive number is used, the time starts at 0 and is incremented by *number* for each new data record. |
| `-wait` *number* | causes a wait of *number* seconds between records generated. |
| `-cycle` *number* | recycles data after *number* cycles. |
| `-vers` | displays version information. |
| `-?` | displays the syntax description. |

By piping `sdlgendata` output to `dsilog` with either the `–vi` or `–vo` options, you can verify the input (`-vi`) and verify the output (`-vo`) before you begin logging with your own process or program.

**NOTE** After you are finished testing, delete all log files created from the test. Otherwise, these files remain as part of the log file test.

Use the following command to pipe data from `sdlgendata` to the logging process. The `-vi` option specifies that data is discarded and errors are written to `stdout`. Press **CTRL+C** or other interrupt control character to stop data generation.

```
sdlgendata logfile_set class -wait 5 | dsilog \
logfile_set class -s 10 -vi
```

The previous command generates data that looks like this:

```
dsilog
I:  744996402  1.0000  2.0000  3.0000   4.0000   5.0000   6.0000    7.0000
I:  744996407  2.0000  3.0000  4.0000   5.0000   6.0000   7.0000    8.0000
I:  744996412  3.0000  4.0000  5.0000   6.0000   7.0000   8.0000    9.0000
I:  744996417  4.0000  5.0000  6.0000   7.0000   8.0000   9.0000    10.0000
I:  744996422  5.0000  6.0000  7.0000   8.0000   9.0000   10.0000   11.0000
I:  744996427  6.0000  7.0000  8.0000   9.0000   10.0000  11.0000   12.0000
I:  744996432  7.0000  8.0000  9.0000   10.000   11.000   12.0000   13.0000
I:  744996437  8.0000  9.0000  10.0000  11.0000  12.0000  13.0000   14.0000
```

You can also use the `-vo` option of `dsilog` to examine input and summarized output for your real data without actually logging it. The following command pipes `vmstat` at 5-second intervals to `dsilog` where it is summarized to 10 seconds.

```
->vmstat 5 | dsilog logfile_set class -s 10 -vo
```

```
dsilog
I: 744997230  0.0000  0.0000  21.0000  2158.0000  1603.0000  2.0000  2.0000
I: 744997235  0.0000  0.0000  24.0000  2341.0000  1514.0000  0.0000  0.0000
interval marker
L: 744997230  0.0000  0.0000  22.5000  2249.5000  1558.5000  1.0000  1.0000

I: 744997240  0.0000  0.0000  23.0000  2330.0000  1513.0000  0.0000  0.0000
I: 744997245  0.0000  0.0000  20.0000  2326.0000  1513.0000  0.0000  0.0000
interval marker
L: 744997240  0.0000  0.0000  21.5000  2328.0000  1513.0000  0.0000  0.0000

I: 744997250  0.0000  0.0000  22.0000  2326.0000  1513.0000  0.0000  0.0000
I: 744997255  0.0000  0.0000  22.0000  2303.0000  1513.0000  0.0000  0.0000
interval marker
L: 744997250  0.0000  0.0000  22.0000  2314.5000  1513.0000  0.0000  0.0000

I: 744997260  0.0000  0.0000  22.0000  2303.0000  1512.0000  0.0000  0.0000
I: 744997265  0.0000  0.0000  28.0000  2917.0000  1089.0000  9.0000 33.0000
interval marker
L: 744997260  0.0000  0.0000  25.0000  2610.0000  1300.5000  4.5000 16.5000

I: 744997270  0.0000  0.0000  28.0000  2887.0000  1011.0000  3.0000  9.0000
I: 744997275  0.0000  0.0000  27.0000  3128.0000   763.0000  8.0000  6.0000
interval marker
L: 744997270  0.0000  0.0000  27.5000  3007.5000   887.0000  5.5000 12.5000
```

You can also use the `dsilog -vo` option to use a file of old data for testing, as long as the data contains its own UNIX timestamp (seconds since 1/1/70 00:00:00). To use a file of old data, enter a command like this:

```
dsilog -timestamp -vo <oldfile>
```

# Creating a Format File

Create a format file to map the data input to the class specification if:

- the data input contains data that is not included in the class specification.
- incoming data has metrics in a different order than you have specified in the class specification.

A format file is an ASCII text file that you can create with vi or any text editor. Use the `-f` option in `dsilog` to specify the fully qualified name of the format file.

Because the logging process works by searching for the first valid character after a delimiter (either a space by default or user-defined with the `dsilog -c` option) to start the next metric, the format file simply tells the logging process which fields to skip and what metric names to associate with fields not skipped.

`$numeric` tells the logging process to skip one numeric metric field and go to the next. `$any` tells the logging process to skip one text metric field and go to the next. Note that the format file is limited to 100 fields.

For example, if the incoming data stream contains this information:

```
ABC 987 654 123 456
```

and you want to log only the first numeric field into a metric named `metric_1`, the format file would look like this:

```
$any metric_1
```

This tells the logging process to log only the information in the first numeric field and discard the rest of the data. To log only the information in the third numeric field, the format file would look like this:

```
$any $numeric $numeric metric_1
```

To log all four numeric data items, in reverse order, the format file would look like this:

```
$any metric_4 metric_3 metric_2 metric_1
```

If the incoming data stream contains the following information:

```
/users    15.9    3295    56.79%    xdisk1 /dev/dsk/
c0d0s*
```

and you want to log only the first text metric and the first two numeric fields into metric fields you name `text_1`, `num_1`, and `num_2`, respectively, the format file would look like this:

```
text_1   num_1   num_2
```

This tells the logging process to log only the information in the first three fields and discard the rest of the data.

To log all of the data, but discard the "%" following the third metric, the format file would look like this:

```
text_1   num_1   num_2   num_3   $any   text_2   text_3
```

Since you are logging numeric fields and the "%" is considered to be a text field, you need to skip it to correctly log the text field that follows it.

To log the data items in a different order the format file would look like this:

```
text_3   num_2   num_1   num_3   $any   text_2   text_1
```

Note that this will result in only the first six characters of `text_3` being logged if `text_1` is declared to be six characters long in the class specification. To log *all* of `text_3` as the first value, change the class specification and alter the data stream to allow extra space.

# Changing a Class Specification

To change a class specification file, you must recreate the whole log file set as follows:

1. Stop the `dsilog` process.
2. Export the data from the existing log file using the UNIX timestamp option if you want to save it or integrate the old data with the new data you will be `logging`. See “Exporting DSI Data” later in this chapter for information on how to do this.
3. Run `sdlutil` to remove the log file set. See “Managing Data With sdlutil” later in this chapter for information on how to do this.
4. Update the class specification file.
5. Run `sdlcomp` to recompile the class specification.
6. Optionally, use the `-i` option in `dsilog` to integrate in the old data you exported in step 2. You may need to manipulate the data to line up with the new data using the `-f format_file` option
7. Run `dsilog` to start logging based on the new class specification.

As long as you have not changed the log file set name or location, you do not need to update the `datasources` file.

# Exporting DSI Data

To export the data from a DSI log file, use the OV Performance Agent `extract` program's `export` function. See Chapters 5 and 6 of the *HP OpenView Performance Agent for UNIX User's Manual* for details on how to use `extract` to export data. An example of exporting DSI data using command line arguments is provided on the following page.

There are several ways to find out what classes and metrics can be exported from the DSI log file. You can use `sdlutil` to list this information as described in "Managing Data With sdlutil" later in this chapter. Or you can use the `extract guide` command to create an export template file that lists the classes and metrics in the DSI log file. You can then use `vi` to edit, name, and save the file. The export template file is used to specify the export format, as described in Chapters 5 and 6 of the *HP OpenView Performance Agent for UNIX User's Manual*.

**NOTE** You *must* be root or the creator of the log file to export DSI log file data.

## Example of Using Extract to Export DSI Log File Data

```
extract -xp -l logfile_set -C class [options]
```

You can use `extract` command line options to do the following:

- ❏ Specify an export output file.
- ❏ Set begin and end dates and times for the first and last intervals to export.
- ❏ Export data only between certain times (shifts).
- ❏ Exclude data for certain days of the week (such as weekends).
- ❏ Specify a separation character to put between metrics on reports.
- ❏ Choose whether or not to display headings and blank records for intervals when no data arrives and what the value displayed should be for missing or null data.
- ❏ Display exported date/time in UNIX format or date and time format.
- ❏ Set additional summarization levels.

## Viewing Data in OV Performance Manager

In order to display data from a DSI log file in OV Performance Manager, you need to configure the DSI log file as an OV Performance Agent data source. Before you start logging data, configure the data source by adding it to the `datasources` file on the OV Performance Agent system. See “Configuring Data Sources” in the *HP Openview Performance Agent Installation and Configuration Guide* for detailed information.

You can centrally view, monitor, analyze, compare, and forecast trends in DSI data using OV Performance Manager. OV Performance Manager helps you identify current and potential problems. It provides the information you need to resolve problems before user productivity is affected.

For information about using OV Performance Manager, see OV Performance Manager online Help.

# Managing Data With sdlutil

To manage the data from a DSI log file, use the `sdlutil` program to do any of the following tasks:

- list currently defined class and metric information to `stdout`. You can redirect output to a file.
- list complete statistics for classes to `stdout`.
- show metric descriptions for all metrics listed.
- list the files in a log file set.
- remove classes and data from a log file set.
- recreate a class specification from the information in the log file set.
- display version information.

## Syntax

`sdlutil` *`logfile_set`* `[option]`

| Variables and Options | Definitions |
|---|---|
| *`logfile_set`* | is the name of a log file set created by compiling a class specification. |
| `-classes` *`classlist`* | provides a class description of all classes listed. If none are listed, all are provided. Separate the Items in the *`classlist`* with spaces. |
| `-stats` *`classlist`* | provides complete statistics for all classes listed. If none are listed, all are provided. Separate the Items in the *`classlist`* with spaces. |
| `-metrics` *`metriclist`* | provides metric descriptions for all metrics in the *`metriclist`*. If none are listed, all are provided. Separate the Items in the *`metriclist`* with spaces. |
| `-id` | displays the shared memory segment ID used by the log file. |
| `-files` | lists all the files in the log file set. |
| `-rm all` | removes all classes and data as well as their data and shared memory ID from the log file. |
| `-decomp` *`classlist`* | recreates a class specification from the information in the log file set. The results are written to `stdout` and should be redirected to a file if you plan to make changes to the file and reuse it. Separate the Items in the *`classlist`* with spaces. |
| `-vers` | displays version information. |
| `-?` | displays the syntax description. |

# 5 Examples of Data Source Integration

# Introduction

Data source integration is a very powerful and very flexible technology. Implementation of DSI can range from simple and straightforward to very complex.

This chapter contains examples of using DSI for the following tasks:

- writing a `dsilog` script
- logging `vmstat` data
- logging `sar` data
- logging `who` word count

# Writing a dsilog Script

The dsilog code is designed to receive a continuous stream of data rows as input. This stream of input is summarized by dsilog according to the specification directives for each class, and one summarized data row is logged per requested summarization interval. OV Performance Manager and perfalarm work best when the timestamps written in the log conform to the expected summarization rate (records per hour). This happens automatically when dsilog is allowed to do the summarization.

dsilog process for each arriving input row, which may cause problems with OV Performance Manager and perfalarm. This method is not recommended.

- ❏ Problematic dsilog script
- ❏ Recommended dsilog script

**Example 1 - Problematic dsilog Script**

In the following script, a new dsilog process is executed for each arriving input row.

```
while :
do
   feed_one_data_row | dsilog sdlname classname
   sleep 50
done
```

**Example 2 - Recommended dsilog Script**

In the following script, one dsilog process receives a continuous stream of input data. feed_one_data_row is written as a function, which provides a continuous data stream to a single dsilog process.

```
# Begin data feed function
feed_one_data_row()
  {
   while :
   do
```

```
#  Perform whatever operations necessary to produce one row
#  of data for feed to a dsilog process
   sleep 50
   done
  }
#  End data feed function

#  Script mainline code
   feed_one_data_row | dsilog sdlname classname
```

# Logging vmstat Data

This example shows you how to set up data source integration using default settings to log the first two values reported by `vmstat`. You can either read this section as an overview of how the data source integration process works, or perform each task to create an equivalent DSI log file on your system.

The procedures needed to implement data source integration are:

- ❏ Creating a class specification file.
- ❏ Compiling the class specification file.
- ❏ Starting the `dsilog` logging process.

## Creating a Class Specification File

The class specification file is a text file that you create to describe the class, or set of incoming data, as well as each individual number you intend to log as a metric within the class. The file can be created with the text editor of your choice. The file for this example of data source integration should be created in the `/tmp/` directory.

The following example shows the class specification file required to describe the first two `vmstat` numbers for logging in a class called `VMSTAT_STATS`. Because only two metrics are defined in this class, the logging process ignores the remainder of each `vmstat` output record. Each line in the file is explained in the comment lines that follow it.

```
CLASS VMSTAT_STATS = 10001;
  # Assigns a unique name and number to vmstat class data.
  # The semicolon is required to terminate the class section
  # of the file.

METRICS
  # Indicates that everything that follows is a description
  # of a number (metric) to be logged.

RUN_Q_PROCS = 106;
      # Assigns a unique name and number to a single metric.
      # The semicolon is required to terminate each metric.

BLOCKED_PROCS = 107;
      # Assigns a unique name and number to another metric.
      # The semicolon is required to terminate each metric.
```

## Compiling the Class Specification File

When you compile the class specification file using `sdlcomp`, the file is checked for syntax errors. If none are found, `sdlcomp` creates or updates a set of log files to hold the data for the class.

Use the file name you gave to the class specification file and then specify a name for *`logfile_set_name`* that makes it easy to remember what kind of data the log file contains. In the command and compiler output example below, `/tmp/vmstat.spec` is used as the file name and `/tmp/VMSTAT_DATA` is used for the log file set.

```
-> sdlcomp /tmp/vmstat.spec /tmp/VMSTAT_DATA

sdlcomp X.01.04
Check class specification syntax.

CLASS VMSTAT_STATS = 10001;

METRICS
RUN_Q_PROCS       = 106;
BLOCKED_PROCS     = 107;

NOTE: Time stamp inserted as first metric by default.

Syntax check successful.

Update SDL VMSTAT_DATA.
Shared memory ID used by vmstat_data=219

Class VMSTAT_STATS successfully added to log file set.
```

This example creates a log file set called `VMSTAT_DATA` in the `/tmp/` directory, which includes a root file and description file in addition to the data file. The log file set is ready to accept logged data. If there are syntax errors in the class specification file, messages indicating the problems are displayed and the log file set is not created.

## Starting the dsilog Logging Process

Now you can pipe the output of `vmstat` directly to the `dsilog` logging process. Use the following command:

```
vmstat 60 | dsilog /tmp/VMSTAT_DATA VMSTAT_STATS &
```

This command runs `vmstat` every 60 seconds and sends the output directly to the `VMSTAT_STATS` class in the `VMSTAT_DATA` log file set. The command runs in the background. You could also use `remsh` to feed `vmstat` in from a remote system.

Note that the following message is generated at the start of the logging process:

```
Metric null has invalid data
Ignore to end of line, metric value exceeds maximum
```

This message is a result of the header line in the `vmstat` output that `dsilog` cannot log. Although the message appears on the screen, `dsilog` continues to run and begins logging data with the first valid input line.

## Accessing the Data

You can use the `sdlutil` program to report on the contents of the class:

```
sdlutil /tmp/VMSTAT_DATA -stats VMSTAT_STATS
```

**NOTE** By default, data will be summarized and logged once every five minutes.

You can use `extract` program command line arguments to export data from the class. For example:

```
extract -xp -l /tmp/VMSTAT_DATA -C VMSTAT_STATS -ut -f stdout
```

Note that to export DSI data, you must be root or the creator of the log file.

# Logging sar Data from One File

**NOTE** This example does not apply for Linux.

This example shows you how to set up several DSI data collections using the standard `sar` (system activity report) utility to provide the data.

When you use a system utility, it is important to understand exactly how that utility reports the data. For example, note the difference between the following two `sar` commands:

```
sar -u 1 1

   HP-UX hpptc99 A.11.00 E 9000/855    04/10/99

   10:53:15    %usr    %sys    %wio   %idle
   10:53:16       2       7       6      85

sar -u 5 2

   HP-UX hpptc99 A.11.00 E 9000/855    04/10/99

   10:53:31    %usr    %sys    %wio   %idle
   10:53:36          4       5       0      91
   10:53:41          0       0       0      99

Average            2       2       0      95
```

As you can see, specifying an iteration value greater than 1 causes `sar` to display an average across the interval. This average may or may not be of interest but can affect your DSI class specification file and data conversion. You should be aware that the output of `sar`, or other system utilities, may be different when executed on different UNIX platforms. You should become very familiar with the utility you are planning to use before creating your DSI class specification file.

Our first example uses `sar` to monitor CPU utilization via the `-u` option of `sar`. If you look at the man page for `sar`, you will see that the `-u` option reports the portion of time running in user mode (%usr), running in system mode (%sys), idle with some process waiting for block I/O (%wio),

and otherwise idle (%idle). Because we are more interested in monitoring CPU activity over a long period of time, we use the form of sar that does not show the average.

## Creating a Class Specification File

The first task to complete is the creation of a DSI class specification file. The following is an example of a class specification that can be used to describe the incoming data:

```
#  sar_u.spec
#
#  sar -u class definition for HP systems.
#
#  ==> 1 minute data; max 24 hours; indexed by hour; roll by day
#

CLASS sar_u = 1000
LABEL "sar -u data"
INDEX BY         hour
MAX INDEXES      24
ROLL BY          day
ACTION "./sar_u_roll $PT_START$ $PT_END$"
RECORDS PER HOUR 60
;

METRICS

hours_1 = 1001
LABEL "Collection Hour"
PRECISION 0;

minutes_1 = 1002
LABEL "Collection Minute"
PRECISION 0;

seconds_1 = 1003
LABEL "Collection Second"
PRECISION 0;

user_cpu = 1004
LABEL "%user"
AVERAGED
MAXIMUM 100
PRECISION 0
;

sys_cpu = 1005
LABEL "%sys"
```

```
AVERAGED
MAXIMUM 100
PRECISION 0
;


wait_IO_cpu = 1006
LABEL "%wio"
AVERAGED
MAXIMUM 100
PRECISION 0
;

idle_cpu = 1007
LABEL "%idle"
AVERAGED
MAXIMUM 100
PRECISION 0
;
```

## Compiling the Class Specification File

The next task is to compile the class specification file using the following command.

```
sdlcomp sar_u.spec sar_u_log
```

The output of the `sar -u` command is a system header line, a blank line, an option header line, and a data line consisting of a time stamp followed by the data we want to capture. The last line is the only line that is interesting. So, from the `sar -u` command, we need a mechanism to save only the last line of output and feed that data to DSI.

`dsilog` expects to receive data from `stdin`. To start the logging process, you could pipe output from the process you are using to `dsilog`. However, you can only have one pipe (`|`) in the command line. When two pipes are used, UNIX buffering retains the output from the first command until 8000 characters have been written before continuing to the second command and piping out to the log file. As a result, doing something like the following does not work:

```
sar -u 60 1 | tail -1 | dsilog
```

Therefore, we use a `fifo` as the input source for DSI. However, this is not without its problems.

Assume we were to use the following script:

```
#!/bin/ksh                  sar_u_feed

# sar_u_feed script that provides sar -u data to DSI via
# a fifo(sar_u.fifo)

while :                       # (infinite loop)
do

# specify a one minute interval using tail to extract the
# last sar output record(contains the time stamp and data),
# saving the data to a file.

/usr/bin/sar -u 60 1 2>/tmp/dsierr | tail -1 > /usr/tmp/sar_u_data

# Copy the sar data to the fifo that the dsilog process is
# reading.

cat /usr/tmp/sar_u_data > ./sar_u.fifo

done
```

Unfortunately, this script will not produce the desired results if run as is. This is because the `cat` command opens the `fifo`, writes the data record, and then closes the `fifo`. The close indicates to `dsilog` that there is no more data to be written to the log, so `dsilog` writes this one data record and terminates. What is needed is a dummy process to "hold" the `fifo` open. Therefore, we need a dummy `fifo` and a process that opens the dummy `fifo` for input and the `sar_u.fifo` for output. This will hold the `sar_u.fifo` open, thereby preventing `dsilog` from terminating.

## Starting the DSI Logging Process

Now let's take a step by step approach to getting the `sar -u` data to `dsilog`.

1. Create two `fifos`; one is the dummy `fifo` used to "hold open" the real input `fifo`.

   ```
   # Dummy fifo.
   mkfifo ./hold_open.fifo
   # Real input fifo for dsilog
   mkfifo ./sar_u.fifo
   ```

2. Start `dsilog` using the `-i` option to specify the input coming from a `fifo`. It is important to start `dsilog` before starting the `sar` data feed (`sar_u_feed`).

```
dsilog ./sar_u_log sar_u \
-i ./sar_u.fifo &
```

3. Start the dummy process to hold open the input `fifo`.

```
cat ./hold_open.fifo  \
 > ./sar_u.fifo &
```

4. Start the sar data feed script (sar_u_feed).

```
./sar_u_feed &
```

5. The `sar_u_feed` script will feed data to `dsilog` until it is killed or the `cat` that holds the `fifo` open is killed. Our class specification file states that `sar_u_log` will be indexed by hour, contain a maximum of 24 hours, and at the start of the next day (roll by day), the script `sar_u_roll` will be executed.

```
!/bin/ksh                sar_u_roll
#
# Save parameters and current date in sar_u_log_roll_file.
# (Example of adding comments/other data to the roll file).

mydate=`date`
echo "$# $0 $1 $2" >> ./sar_u_log_roll_file
echo $mydate       >> ./sar_u_log_roll_file

extract -l ./sar_u_log -C sar_u -B $1 -E $2 -1 -f \
stdout -xp >> ./sar_u_log_roll_file
```

6. The roll script saves the data being rolled out in an ASCII text file that can be examined with a text editor or printed to a printer.

# Logging sar Data from Several Files

If you are interested in more than just CPU utilization, you can either have one class specification file that describes the data, or have a class specification file for each option and compile these into one log file set. The first example shows separate class specification files compiled into a single log file set.

In this example, we will monitor CPU utilization, buffer activity (`sar -b`), and system calls (`sar -c`). Logging data in this manner requires three class specification files, three `dsilog` processes, three `dsilog` input `fifo`s, and three scripts to provide the **sar** data.

## Creating Class Specification Files

The following are the class specification files for each of these options.

```
#  sar_u_mc.spec
#
#  sar -u class definition for log files on HP systems.
#
#  ==> 1 minute data; max 24 hours; indexed by hour; roll by day
#

CLASS sar_u = 1000
LABEL "sar -u data"
INDEX BY         hour
MAX INDEXES      24
ROLL BY          day
ACTION "./sar_u_mc_roll $PT_START$ $PT_END$"
RECORDS PER HOUR 60
;

METRICS

hours_1 = 1001
LABEL "Collection Hour"
PRECISION 0
;

minutes_1 = 1002
LABEL "Collection Minute"
PRECISION 0
;

seconds_1 = 1003
```

```
LABEL "Collection Second"
PRECISION 0
;
user_cpu = 1004
LABEL "%user"
AVERAGED
MAXIMUM 100
PRECISION 0
;

sys_cpu = 1005
LABEL "%sys"
AVERAGED
MAXIMUM 100
PRECISION 0
;

wait_IO_cpu = 1006
LABEL "%wio"
AVERAGED
MAXIMUM 100
PRECISION 0
;

idle_cpu = 1007
LABEL "%idle"
AVERAGED
MAXIMUM 100
PRECISION 0
;

#  sar_b_mc.spec
#
#  sar -b class definition for log files on HP systems.
#
#  ==> 1 minute data; max 24 hours; indexed by hour; roll by day
#

CLASS sar_b = 2000
LABEL "sar -b data"
INDEX BY         hour
MAX INDEXES      24
ROLL BY          day
ACTION "./sar_b_mc_roll $PT_START$ $PT_END$"
RECORDS PER HOUR 60
;

METRICS

hours_2 = 2001
LABEL "Collection Hour"
```

```
PRECISION 0
;

minutes_2 = 2002
LABEL "Collection Minute"
PRECISION 0
;

seconds_2 = 2003
LABEL "Collection Second"
PRECISION 0
;

bread_per_sec = 2004
LABEL "bread/s"
PRECISION 0
;

lread_per_sec = 2005
LABEL "lread/s"
PRECISION 0
;

read_cache = 2006
LABEL "%rcache"
MAXIMUM 100
PRECISION 0
;

bwrit_per_sec = 2007
LABEL "bwrit/s"
PRECISION 0
;

lwrit_per_sec = 2008
LABEL "lwrit/s"
PRECISION 0
;

write_cache = 2009
LABEL "%wcache"
MAXIMUM 100
PRECISION 0
;

pread_per_sec = 2010
LABEL "pread/s"
PRECISION 0
;

pwrit_per_sec = 2011
```

```
LABEL "pwrit/s"
PRECISION 0
;

#  sar_c_mc.spec
#
#  sar -c class definition for log files on HP systems.
#
#  ==> 1 minute data; max 24 hours; indexed by hour; roll by day
#

CLASS sar_c = 5000
LABEL "sar -c data"
INDEX BY         hour
MAX INDEXES      24
ROLL BY          day
ACTION "./sar_c_mc_roll $PT_START$ $PT_END$"
RECORDS PER HOUR 60
;

METRICS

hours_5 = 5001
LABEL "Collection Hour"
PRECISION 0
;

minutes_5 = 5002
LABEL "Collection Minute"
PRECISION 0
;

seconds_5 = 5003
LABEL "Collection Second"
PRECISION 0
;

scall_per_sec = 5004
LABEL "scall/s"
PRECISION 0
;

sread_per_sec = 5005
LABEL "sread/s"
PRECISION 0
;

swrit_per_sec = 5006
LABEL "swrit/s"
PRECISION 0
;
```

```
fork_per_sec = 5007
LABEL "fork/s"
PRECISION 2
;

exec_per_sec = 5008
LABEL "exec/s"
PRECISION 2
;

rchar_per_sec = 5009
LABEL "rchar"
PRECISION 0
;

wchar_per_sec = 5010
LABEL "wchar/s"
PRECISION 0
;
```

The following are the two additional scripts that are needed to supply the sar data.

```
#!/bin/ksh

# sar_b_feed script that provides sar -b data to DSI via
# a fifo (sar_b.fifo)

while :                      # (infinite loop)
do

# specify a one minute interval using tail to extract the
# last sar output record(contains the time stamp and data),
# saving the data to a file.

/usr/bin/sar -b 60 1 2>/tmp/dsierr | tail -1 &> \
/usr/tmp/sar_b_data


# Copy the sar data to the fifo that the dsilog process is reading.

cat /usr/tmp/sar_b_data > ./sar_b.fifo

done

#!/bin/ksh                          sar_c_feed

# sar_c_feed script that provides sar -c data to DSI via
# a fifo(sar_c.fifo)
```

```
while :                                 # (infinite loop)
do

# specify a one minute interval using tail to extract the
# last sar output record(contains the time stamp and data),
# saving the data to a file.

/usr/bin/sar -c 60 1 2>/tmp/dsierr | tail -1 > /usr/tmp/sar_c_data


# Copy the sar data to the fifo that the dsilog process is reading.


cat /usr/tmp/sar_c_data > ./sar_c.fifo

done
```

## Compiling the Class Specification Files

Compile the three specification files into one log file set:

```
sdlcomp ./sar_u_mc.spec sar_mc_log
sdlcomp ./sar_b_mc.spec sar_mc_log
sdlcomp ./sar_c_mc.spec sar_mc_log
```

## Starting the DSI Logging Process

Returning to the step by step approach for the `sar` data:

1. Create four `fifos`; one will be the dummy `fifo` used to “hold open” the three real input `fifos`.

   ```
   # Dummy fifo.
   mkfifo ./hold_open.fifo

   # sar -u input fifo for dsilog.
   mkfifo ./sar_u.fifo

   # sar -b input fifo for dsilog.
   mkfifo ./sar_b.fifo

   # sar -c input fifo for dsilog.
   mkfifo ./sar_c.fifo
   ```

2. Start `dsilog` using the `-i` option to specify the input coming from a `fifo`. It is important to start `dsilog` before starting the `sar` data feeds.

```
dsilog ./sar_mc_log sar_u \
-i ./sar_u.fifo &

dsilog ./sar_mc_log sar_b \
-i ./sar_b.fifo &

dsilog ./sar_mc_log sar_c \
-i ./sar_c.fifo &
```

3. Start the dummy process to hold open the input `fifo`.

```
cat ./hold_open.fifo \
 > ./sar_u.fifo &

cat ./hold_open.fifo \
 > ./sar_b.fifo &

cat ./hold_open.fifo \
> ./sar_c.fifo &
```

4. Start the `sar` data feed scripts.

```
./sar_u_feed &

./sar_b_feed &

./sar_c_feed &
```

# Logging sar Data for Several Options

The last example for using sar to supply data to DSI uses one specification file to define the data from several sar options (ubycwavm).

```
#  sar_ubycwavm.spec
#
#  sar -ubycwavm class definition for HP systems.
#
#  ==> 1 minute data; max 24 hours; indexed by hour; roll by day
#

CLASS sar_ubycwavm = 1000
LABEL "sar -ubycwavm data"
INDEX BY         hour
MAX INDEXES      24
ROLL BY          day
ACTION "./sar_ubycwavm_roll $PT_START$ $PT_END$"
RECORDS PER HOUR 60
;

METRICS
hours = 1001
LABEL "Collection Hour"
PRECISION 0;

minutes = 1002
LABEL "Collection Minute"
PRECISION 0;

seconds = 1003
LABEL "Collection Second"
PRECISION 0;

user_cpu = 1004
LABEL "%user"
AVERAGED
MAXIMUM 100
PRECISION 0
;

sys_cpu = 1005
LABEL "%sys"
AVERAGED
MAXIMUM 100
PRECISION 0
;
```

```
wait_IO_cpu = 1006
LABEL "%wio"
AVERAGED
MAXIMUM 100
PRECISION 0
;

idle_cpu = 1007
LABEL "%idle"
AVERAGED
MAXIMUM 100
PRECISION 0
;

bread_per_sec = 1008
LABEL "bread/s"
PRECISION 0
;

lread_per_sec = 1009
LABEL "lread/s"
PRECISION 0
;

read_cache = 1010
LABEL "%rcache"
MAXIMUM 100
PRECISION 0
;

bwrit_per_sec = 1011
LABEL "bwrit/s"
PRECISION 0
;

lwrit_per_sec = 1012
LABEL "lwrit/s"
PRECISION 0
;

write_cache = 1013
LABEL "%wcache"
MAXIMUM 100
PRECISION 0
;
pread_per_sec = 1014
LABEL "pread/s"
PRECISION 0
;

pwrit_per_sec = 1015
```

```
LABEL "pwrit/s"
PRECISION 0
;

rawch = 1016
LABEL "rawch/s"
PRECISION 0
;

canch = 1017
LABEL "canch/s"
PRECISION 0
;

outch = 1018
LABEL "outch/s"
PRECISION 0
;

rcvin = 1019
LABEL "rcvin/s"
PRECISION 0
;

xmtin = 1020
LABEL "xmtin/s"
PRECISION 0
;

mdmin = 1021
LABEL "mdmin/s"
PRECISION 0
;

scall_per_sec = 1022
LABEL "scall/s"
PRECISION 0
;

sread_per_sec = 1023
LABEL "sread/s"
PRECISION 0
;

swrit_per_sec = 1024
LABEL "swrit/s"
PRECISION 0
;

fork_per_sec = 1025
LABEL "fork/s"
```

```
PRECISION 2
;

exec_per_sec = 1026
LABEL "exec/s"
PRECISION 2
;

rchar_per_sec = 1027
LABEL "rchar/s"
PRECISION 0
;

wchar_per_sec = 1028
LABEL "wchar/s"
PRECISION 0
;

swpin = 1029
LABEL "swpin/s"
PRECISION 2
;

bswin = 1030
LABEL "bswin/s"
PRECISION 1
;

swpot = 1031
LABEL "swpot/s"
PRECISION 2
;

bswot = 1032
LABEL "bswot/s"
PRECISION 1
;
blks = 1033
LABEL "pswch/s"
PRECISION 0
;

iget_per_sec = 1034
LABEL "iget/s"
PRECISION 0
;

namei_per_sec = 1035
LABEL "namei/s"
PRECISION 0
;
```

```
dirbk_per_sec = 1036
LABEL "dirbk/s"
PRECISION 0
;

num_proc = 1037
LABEL "num proc"
PRECISION 0
;

proc_tbl_size = 1038
LABEL "proc tbl size"
PRECISION 0
;

proc_ov = 1039
LABEL "proc ov"
PRECISION 0
;

num_inode = 1040
LABEL "num inode"
PRECISION 0
;

inode_tbl_sz = 1041
LABEL "inode tbl sz"
PRECISION 0
;

inode_ov = 1042
LABEL "inode ov"
PRECISION 0
;

num_file = 1043
LABEL "num file"
PRECISION 0
;

file_tbl_sz = 1044
LABEL "file tbl sz"
PRECISION 0
;

file_ov = 1045
LABEL "file ov"
PRECISION 0
;
```

```
msg_per_sec = 1046
LABEL "msg/s"
PRECISION 2
;

LABEL "sema/s"
PRECISION 2
;
```

At this point, we need to look at the output generated from

```
sar -ubycwavm 1 1:
HP-UX hpptc16 A.09.00 E 9000/855    04/11/95

12:01:41    %usr    %sys    %wio    %idle
         bread/s lread/s %rcache  bwrit/s  lwrit/s %wcache pread/s
         pwrit/s
         rawch/s canch/s outch/s   cvin/s  xmtin/s  mdmin/s
         scall/s sread/s swrit/s   fork/s   exec/s  rchar/s wchar/s
         swpin/s bswin/s swpot/s  bswot/s  pswch/s
          iget/s namei/s dirbk/s
         text-sz  ov  proc-sz  ov  inod-sz  ov  file-sz  ov
           msg/s  sema/s

12:01:42    22      48       30      0
             0     342      100     33      81      59   0    0
             0       0      470      0       0       0
           801     127       71      1.00    1.00    975872 272384
          0.00     0.0     0.00    0.0     251
            28     215      107
         N/A   N/A  131/532    0  639/644   0   358/1141   0
         40.00    0.00
```

This output looks similar to the `sar -u` output with several additional lines of headers and data. We will again use tail to extract the lines of data, but we need to present this as "one" data record to `dsilog`. The following script captures the data and uses the tr (translate character) utility to "strip" the line feeds so `dsilog` will see it as one single line of input data.

```
#!/bin/ksh                    Sar_ubycwavm_feed

# Script that provides sar data to DSI via a fifo(sar_data.fifo)

while :                        # (infinite loop)
do

# specify a one minute interval using tail to extract the
# last sar output records (contains the time stamp and data)
```

```
# and pipe that data to tr to strip the new lines converting
# the eight lines of output to one line of output.


/usr/bin/sar -ubycwavm 60 1 2>/tmp/dsierr | tail -8 | \
tr "\012" " " > /usr/tmp/sar_data

# Copy the sar data to the fifo that the dsilog process is reading.

cat /usr/tmp/sar_data > ./sar_data.fifo

# Print a newline on the fifo so that DSI knows that this is
# the end of the input record.

print "\012" > ./sar_data.fifo

done
```

The step-by-step process follows that for the earlier `sar -u` example with the exception of log file set names, class names, `fifo` name (`sar_ubycwavm.fifo`), and the script listed above to provide the `sar` data.

# Logging the Number of System Users

The next example uses who to monitor the number of system users. Again, we start with a class specification file.

```
#  who_wc.spec
#
#  who word count DSI spec file
#

CLASS who_metrics = 150
LABEL "who wc data"
INDEX BY         hour
MAX INDEXES      120
ROLL BY          hour
RECORDS PER HOUR 60
;

METRICS
who_wc = 151
label "who wc"
averaged
maximum 1000
precision 0
;
```

Compile the specification file to create a log file:

```
sdlcomp ./who_wc.spec ./who_wc_log.
```

Unlike sar, you cannot specify an interval or iteration value with who, so we create a script that provides, at a minimum, interval control.

```
#!/bin/ksh         who_data_feed

while :
do
    # sleep for one minute (this should correspond with the
    # RECORDS PER HOUR clause in the specification file).

sleep 60

    # Pipe the output of who into wc to count
    # the number of users on the system.

who | wc -l > /usr/tmp/who_data

# copy the data record to the pipe being read by dsilog.
```

```
cat /usr/tmp/who_data > ./who.fifo

done
```

Again we need a `fifo` and a script to supply the data to `dsilog`, so we return to the step by step process.

1. Create two `fifo`s; one will be the dummy `fifo` used to "hold open" the real input `fifo`.

   ```
   # Dummy fifo.
   mkfifo ./hold_open.fifo

   # Real input fifo for dsilog.
   mkfifo ./who.fifo
   ```

2. Start `dsilog` using the `-i` option to specify the input coming from a fifo. It is important to start `dsilog` before starting the `who` data feed.

   ```
   dsilog ./who_wc_log who_metrics \
   -i ./who.fifo &
   ```

3. Start the dummy process to hold open the input `fifo`.

   ```
   cat ./hold_open.fifo \
   > ./who.fifo &
   ```

4. Start the `who` data feed script (`who_data_feed`).

   ```
   ./who_data_feed  &
   ```

# 6 Error Messages

# DSI Error Messages

There are three types of DSI error messages: class specification, dsilog logging process, and general.

- Class specification error messages format consists of the prefix `SDL`, followed by the message number.
- `dsilog` logging process messages format consists of the prefix `DSILOG`, followed by the message number.
- General error messages can be generated by either of the above as well as other tasks. These messages have a minus sign (`-`) prefix and the message number.

DSI error messages are listed in this chapter. `SDL` and `DSILOG` error messages are listed in numeric order, along with the actions you take to recover from the error condition. General error messages are self-explanatory, so no recovery actions are given.

# SDL Error Messages

SDL error messages are Self Describing Logfile class specification error messages, with the format, SDL<*message number*>.

**Message SDL1**

ERROR: Expected equal sign, “=”.

An “=” was expected here.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL2**

ERROR: Expected semi-colon, “;”.

A semi-colon (;) marks the end of the class specification and the end of each metric specification. You may also see this message if an incorrect or misspelled word is found where a semi-colon should have been.

For example: If you enter

```
class xxxxx = 10
   label "this is a test"
   metric 1000;
```

instead of

```
class xxxxx = 10
   label "this is a test"
   capacity 1000;
```

you would see this error message and it would point to the word “metric.”

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL3**

ERROR: Precision must be one of {0, 1, 2, 3, 4, 5}

Precision determines the number of decimal places used when converting numbers internally to integers and back to numeric representations of the metric value.

**Action:**

See “PRECISION” in Chapter 3 for more information.

**Message SDL4**

```
ERROR: Expected quoted string.
```

A string of text was expected.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL5**

```
ERROR: Unterminated string.
```

The string must end in double quotes.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL6**

```
NOTE: Time stamp inserted at first metric by default.
```

A timestamp metric is automatically inserted as the first metric in each class.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL7**

```
ERROR: Expected metric description.
```

The metrics section must start with the METRICS keyword before the first metric definition.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL8**

```
ERROR: Expected data class specification.
```

The class section of the class specification must start with the CLASS keyword.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL9**

```
ERROR: Expected identifier.
```

An identifier for either the metric or class was expected. The identifier must start with an alphabetic character, can contain alphanumeric characters or underscores, and is not case-sensitive.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL10**

```
ERROR: Expected positive integer.
```

Number form is incorrect.

**Action:**

Enter numbers as positive integers only.

**Message SDL13**

```
ERROR: Expected specification for maximum number of indexes.
```

The maximum number of indexes is required to calculate class capacity.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL14**

```
ERROR: Syntax Error.
```

The syntax you entered is incorrect.

**Action:**

Check the syntax and make corrections as needed. See Chapter 3, “Class Specification Syntax”, for more information.

**Message SDL15**

```
ERROR: Expected metric description.
```

A metric description is missing.

**Action:**

Enter a metric description to define the individual data items for the class. See “Metrics Descriptions” in Chapter 3 for more information.

**Message SDL16**

```
ERROR: Expected metric type.
```

Each metric must have a `metric_name` and a numeric `metric_id`.

**Action:**

See “Metrics Descriptions” in Chapter 3 for more information.

**Message SDL17**

```
ERROR: Time stamp metric attributes may not be changed.
```

A timestamp metric is automatically inserted as the first metric in each class. You can change the position of the timestamp, or eliminate it and use a UNIX timestamp.

**Action:**

See “Metrics Descriptions” in Chapter 3 for more information.

**Message SDL18**

```
ERROR: Roll action limited to 199 characters.
```

The upper limit for ROLL BY action is 199 characters.

**Action:**

See “INDEX BY, MAX INDEXES, AND ROLL BY” in Chapter 3 for more information.

### Message SDL19

```
ERROR: Could not open specification file (file).
```

In the command line `sdlcomp specification_file`, the specification file could not be opened. The error follows in the next line as in:

```
$/usr/perf/bin/sdlcomp /xxx
ERROR: Could not open specification file /xxx.
```

**Action:**

Verify that the file is readable. If it is, verify the name of the file and that is was entered correctly.

### MessageSDL20

```
ERROR: Metric descriptions not found.
```

Metric description is incorrectly formatted.

**Action:**

Make sure you begin the metrics section of the class statement with the METRICS keyword. See “Metrics Descriptions” in Chapter 3 for more information.

### Message SDL21

```
ERROR: Expected metric name to begin metric description.
```

Metric name may be missing or metric description is incorrectly formatted.

**Action:**

Metric name may be missing or metric description is incorrectly formatted.

**Message SDL24**

`ERROR: Expected MAX INDEXES specification.`

A `MAX INDEXES` value is required when you specify INDEX BY.

**Action:**

Enter the required value. See “INDEX BY, MAX INDEXES, AND ROLL BY” in Chapter 3 for more information.

**Message SDL25**

`ERROR: Expected index SPAN specification.`

A value is missing for INDEX BY.

**Action:**

Enter a qualifier when you specify INDEX BY. See “INDEX BY, MAX INDEXES, AND ROLL BY” in Chapter 3 for more information.

**Message SDL26**

`ERROR: Minimum must be zero.`

The number must be zero or greater.

**Message SDL27**

`Expected positive integer.`

A positive value is missing.

**Action:**

Enter numbers as positive integers only.

**Message SDL29**

`ERROR: Summarization metric does not exist.`

You used `SUMMARIZED BY` for the summarization method, but did not specify a metric_name.

**Action:**

See “Metrics Descriptions” in Chapter 3 for more information.

### Message SDL30

```
ERROR: Expected 'HOUR', 'DAY', or 'MONTH'.
```

A qualifier for the entry is missing.

**Action:**

You must enter one of these qualifiers. See “INDEX BY” in Chapter 3 for more information.

### Message SDL33

```
ERROR: Class id number must be between 1 and 999999.
```

The class-id must be numeric and can contain up to 6 digits.

**Action:**

Enter a class ID number for the class that does not exceed the six-digit maximum. See “Class Specification Syntax” in Chapter 3 for more information.

### Message SDL35

```
ERROR: Found more than one index/capacity statement.
```

You can only have one `INDEX BY` or `CAPACITY` statement per `CLASS` section.

**Action:**

Complete the entries according to the formatting restrictions in “Class Specification Syntax” in Chapter 3.

### Message SDL36

```
ERROR: Found more than one metric type statement.
```

You can have only one `METRICS` keyword for each metric definition.

**Action:**

See “Metrics Descriptions” in Chapter 3 for formatting information.

**Message SDL37**

`ERROR: Found more than one metric maximum statement.`

You can have only one `MAXIMUM` statement for each metric definition.

**Action:**

See “Metrics Descriptions” in Chapter 3 for formatting information.

**Message SDL39**

`ERROR: Found more than one metric summarization specification.`

You can have only one summarization method (`TOTALED`, `AVERAGED`, or `SUMMARIZED BY`) for each metric definition.

**Action:**

See “Summarization Method” in Chapter 3 for more information.

**Message SDL40**

`ERROR: Found more than one label statement.`

You can have only one LABEL for each metric or class definition.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL42**

`ERROR: Found more than one metric precision statement.`

You can have only one `PRECISION` statement for each metric definition.

**Action:**

See the “PRECISION” section in Chapter 3 for more information.

**Message SDL44**

```
ERROR: SCALE, MINIMUM, MAXIMUM, (summarization) are
inconsistent with text metrics
```

These elements of the class specification syntax are only valid for numeric metrics.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL46**

```
ERROR: Inappropriate summarization metric (!).
```

You cannot summarize by the timestamp metric.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL47**

```
ERROR: Expected metric name.
```

Each `METRICS` statement must include a metric_name.

**Action:**

See “Metrics Descriptions” in Chapter 3 for more information.

**Message SDL47**

```
ERROR: Expected metric name.
```

Each `METRICS` statement must include a metric_name.

**Action:**

See “Metrics Descriptions” in Chapter 3 for more information.

**Message SDL48**

```
ERROR: Expected positive integer.
```

The CAPACITY statement requires a positive integer.

**Action:**

See “CAPACITY” in Chapter 3 for more information.

**Message SDL49**

`ERROR: Expected metric specification statement.`

The `METRICS` keyword must precede the first metric definition.

**Action:**

See “Metrics Descriptions” in Chapter 3 for more information.

**Message SDL50**

`Object name too long.`

The *`metric_name`* or *`class_name`* can only have up to 20 characters.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL51**

`ERROR: Label too long (max 20 chars).`

The *`class_label`* or *`metric_label`* can only have up to 20 characters.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL53**

`ERROR: Metric must be between 1 and 999999.`

The *`metric_id`* can contain up to 6 digits only.

**Action:**

See “Metrics Descriptions” in Chapter 3 for more information.

**Message SDL54**

ERROR: Found more than one collection rate statement.

You can have only one RECORDS PER HOUR statement for each class description.

**Action:**

See “RECORDS PER HOUR” in Chapter 3 for more information.

### Message SDL55

ERROR: Found more than one roll action statement.

You can have only one ROLL BY statement for each class specification.

**Action:**

See “INDEX BY, MAX INDEXES, AND ROLL BY” in Chapter 3 for more information.

### Message SDL56

ERROR: ROLL BY option cannot be specified without INDEX BY option.

The ROLL BY statement must be preceded by an INDEX BY statement.

**Action:**

See “INDEX BY, MAX INDEXES, AND ROLL BY” in Chapter 3 for more information.

### Message SDL57

ERROR: ROLL BY must specify time equal to or greater than INDEX BY.

Because the roll interval depends on the index interval to identify the data to discard, the ROLL BY time must be greater than or equal to the INDEX BY time.

**Action:**

See “INDEX BY, MAX INDEXES, AND ROLL BY” in Chapter 3 for more information.

**Message SDL58**

```
ERROR: Metric cannot be used to summarize itself.
```

The `SUMMARIZED BY` metric cannot be the same as the *`metric_name`*.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

**Message SDL62**

```
ERROR: Could not open SDL (name).
```

Explanatory messages follow this error. It could be a file system error as in:

```
$/usr/perf/bin/sdlutil xxxxx –classes
ERROR: Could not open SDL xxxxx.
ERROR: Could not open log file set.
```

or it could be an internal error as in:

```
$/usr/perf/bin/sdlutil xxxxx –classes
ERROR: Could not open SDL xxxxx.
ERROR: File is not SDL root file or the
description file is not accessible.
```

You might also see this error if the log file has been moved. Because the pathname information is stored in the DSI log files, the log files cannot be moved to different directories.

**Action:**

If the above description or the follow-up messages do not point to some obvious problem, use `sdlutil` to remove the log file set and rebuild it.

**Message SDL63**

```
ERROR: Some files in log file set (name) are missing.
```

The list of files that make up the log file set was checked and one or more files needed for successful operation were not found.

**Action:**

Unless you know precisely what happened, the best action is to use `sdlutil` to remove the log file set and start over.

**Message SDL66**

`ERROR: Could not open class (name).`

An explanatory message will follow.

**Action:**

Unless it is obvious what the problem is, use `sdlutil` to remove the log file set and start over.

**Message SDL67**

`ERROR: Add class failure.`

Explanatory messages will follow.

The compiler could not add the new class to the log file set.

**Action:**

If all the correct classes in the log file set are accessible, specify a new or different log file set. If they are not, use `sdlutil` to remove the log file set and start over.

**Message SDL72**

`ERROR: Could not open export files (name).`

The file to which the exported data was supposed to be written couldn't be opened.

**Action:**

Check to see if the export file path exists and what permissions it has.

**Message SDL73**

`ERROR: Could not remove shared memory ID (name).`

An explanatory message will follow.

**Action**

To remove the shared memory ID, you must either be the user who created the log file set or the root user. Use the UNIX command `ipcrm -m id` to remove the shared memory ID.

### Message SDL74

`ERROR: Not all files could be removed.`

All the files in the log file set could not be removed.

Explanatory messages will follow.

**Action:**

Do the following to list the files and shared memory ID:

```
sdlutil (logfile set) -files
sdlutil (logfile set) -id
```

To remove the files, use the UNIX command `rm` *`filename`*. To remove the shared memory ID, use the UNIX command `ipcrm -m id`. Note that the shared memory ID will only exist and need to be deleted if `sdlutil` did not properly delete it when the log file set was closed.

### Message SDL80

`ERROR: Summarization metric (metric) not found in class.`

The `SUMMARIZED BY` metric was not previously defined in the `METRIC` section.

**Action:**

See “Metrics Descriptions” in Chapter 3 for more information.

### Message SDL81

`ERROR: Metric id (id) already defined in SDL.`

The *`metric_id`* only needs to be defined once. To reuse a metric definition that has already been defined in another class, specify just the *`metric_name`* without the *`metric_id`* or any other specifications.

**Action:**

See “METRICS” in Chapter 3 for more information.

### Message SDL82

`ERROR: Metric name (name) already defined in SDL.`

The *metric_name* only needs to be defined once. To reuse a metric definition that has already been defined in another class, specify just the *metric_name* without the *metric_id* or any other specifications.

**Action:**

See “METRICS” in Chapter 3 for more information.

### Message SDL83

```
ERROR: Class id (id) already defined in SDL.
```

The *class_id* only needs to be defined once. Check the spelling to be sure you have entered it correctly.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

### Message SDL84

```
ERROR: Class name (name) already defined in SDL.
```

The *class_name* only needs to be defined once. Check the spelling to be sure you have entered it correctly.

**Action:**

See “Class Specification Syntax” in Chapter 3 for more information.

### Message SDL85

```
ERROR: Must specify class to de-compile.
```

You must specify a *class list* when you use -decomp.

**Action:**

See “Managing Data With sdlutil” in Chapter 4 for more information.

### Message SDL87

```
ERROR: You must specify maximum number of classes with
-maxclass.
```

When you use the -maxclass option, you must specify the maximum number of classes to be provided for when creating a new log file set.

**Action**

See “sdlcomp Compiler” in Chapter 4 for more information.

**Message SDL88**

```
ERROR: Option \"!\" is not valid.
```

The command line entry is not valid.

**Action:**

Check what you have entered to ensure that it follows the correct syntax.

**Message SDL89**

```
ERROR: Maximum number of classes (!) for -maxclass is not
valid.
```

The -maxclass number must be greater than zero.

**Action:**

See “sdlcomp Compiler” in Chapter 4 for more information.

**Message SDL90**

```
ERROR: -f option but no result file specified.
```

You must specify a format file when using the -f option.

**Action:**

You must specify a format file when using the -f option.

**Message SDL91**

```
ERROR: No specification file named.
```

No name assigned to class specification file.

**Action:**

You must enter a *specification_file* when using sdlcomp. See "sdlcomp Compiler" in Chapter 4 for more information.

### Message SDL92

```
ERROR: No log file set named.
```

You must enter a *logfile_set* when using sdlcomp.

**Action**

See "sdlcomp Compiler" in Chapter 4 for more information.

### Message SDL93

```
ERROR: Metric ID already defined in class.
```

The *metric_id* only needs to be defined once.

**Action:**

To reuse a metric definition that has already been defined in another class, specify just the *metric_name* without the *metric_id* or any other specifications.

See "Metrics Descriptions" in Chapter 3 for more information.

### Message SDL94

```
ERROR: Metric name already defined in class.
```

The metric-name only needs to be defined once.

**Action:**

To reuse a metric definition that has already been defined in another class, specify just the *metric_name* without the *metric_id* or any other specifications. See "Metrics Descriptions" in Chapter 3 for more information.

### Message SDL95

```
ERROR: Text found after complete class specification.
```

The sdlcomp compiler found text it did not recognize as part of the class specification.

**Action:**

Reenter the specification and try again.

### Message SDL96

`ERROR: Collection rate statement not valid.`

The proper format is `RECORDS PER HOUR` (number). The keywords must be present in this order and cannot be abbreviated.

**Action:**

Correct the keyword and follow the required the format.

### Message SDL97

`ERROR: Expecting integer between 1 and 2,147,483,647.`

You must use a number in this range.

**Action:**

Enter a number that falls within the range.

### Message SDL98

`ERROR: Action requires preceding ROLL BY statement.`

The entry is out of order or is missing in the class specification file.

**Action:**

The action specifies what will happen when the log file rolls. It is important to first know when it should roll. `ROLL BY` must precede `ACTION`.

For example:

```
class xxxxx = 10
   index by month max indexes 12
   action "ll *";
```

should have been:

```
class xxxxx = 10
   index by month max indexes 12
   roll by month
   action "ll *";
```

### Message SDL99

`ERROR: MAX INDEXES requires preceeding INDEX BY statement.`

The entry is out of order or is missing in the class specification file.

**Action:**

To specify a maximum number of indexes, the program needs to know where you are doing an indexing by. The `INDEX BY` statement must precede `MAX INDEXES`.

For example:

```
class xxxxx = 10
   max indexes 12
   label "this is a test";
```

should have been:

```
class xxxxx = 10
   index by month
   max indexes 12
   label "this is a test";
```

### Message SDL100

`WARNING: CAPACITY UNLIMITED not implemented, derived value used. (SDL-100)`

### Message SDL101

`ERROR: Derived capacity too large. (SDL-101)`

# DSILOG Error Messages

DSILOG error messages are `dsilog` logging process messages with the format, `DSILOG<`*`message number`*`>`.

**Message DSILOG1**

```
ERROR: Self describing log file not specified.
```

**Action:**

Correct the command line and try again.

**Message DSILOG2**

```
ERROR: Data class name not specified.
```

The data class must be the second parameter passed to `dsilog`.

**Action:**

Correct the command line and try again.

**Message DSILOG3**

```
ERROR: Could not open data input file (name).
```

The file specified in the command line couldn't be opened. A UNIX file system error appears in the next line of the error message.

**Message DSILOG4**

```
ERROR: OpenClass (\"name\") failed.
```

The class specified couldn't be opened. It may not be in the log file set specified, or its data file isn't accessible.

**Action:**

Explanatory messages will follow giving either an internal error description or a file system error.

### Message DSILOG5

`ERROR: Open of root log file (name) failed.`

The log file set root file couldn't be opened. The reason is shown in the explanatory messages.

### Message DSILOG6

`ERROR: Time stamp not defined in data class.`

The class was built and no timestamp was included.

**Action:**

Use `sdlutil` to remove the log file set and start over.

### Message DSILOG7

`ERROR: (Internal error) AddPoint ( ) failed.`

`dsilog` tried to write a record to the data file and couldn't. Explanatory messages will follow.

### Message DSILOG8

`ERROR: Invalid command line parameter (name).`

The parameter shown was either not recognized as a valid command line option, or it was out of place in the command line.

**Action:**

Correct the command line parameter and try again.

### Message DSILOG9

`ERROR: Could not open format file (name).`

The file directing the match of incoming metrics to those in the data class could not be found or was inaccessible. Explanatory messages will follow with the UNIX file system error.

**Action:**

Check the class specification file to verify that it is present.

**Message DSILOG10**

`ERROR: Illegal metric name (name).`

The format file contained a metric name that was longer than the maximum metric name size or it did not otherwise conform to metric name syntax.

**Action**

Correct the metric name in the class specification and rerun `dsilog`.

**Message DSILOG11**

`ERROR: Too many input metrics defined. Max 100.`

Only 100 metrics can be specified in the format file

**Action:**

The input should be reformatted externally to `dsilog`, or the data source should be split into two or more data sources.

**Message DSILOG12**

`ERROR: Could not find metric (name) in class.`

The metric name found in the format file could not be found in the data class.

**Action**

Make corrections and try again.

**Message DSILOG13**

`ERROR: Required time stamp not found in input specification.`

The -timestamp command line option was used, but the format file did not specify where the timestamp could be found in the incoming data.

**Action:**

Specify where the timestamp can be found.

### Message DSILOG14

```
ERROR: (number) errors, collection aborted.
```

Serious errors were detected when setting up for collection.

**Action:**

Correct the errors and retry. The `-vi` and `-vo` options can also be used to verify the data as it comes in and as it would be logged.

### Message DSILOG15

```
ERROR: Self describing log file and data class not
specified.
```

The command line must specify the log file set and the data class to log data to.

**Action:**

Correct the command line entry and try again.

### Message DSILOG16

```
ERROR: Self describing log file set root file (name) could
not be accessed. error=(number).
```

Couldn't open the log file set root file.

**Action:**

Check the explanatory messages that follow for the problem.

### Message (unnumbered)

```
Metric null has invalid data
Ignore to end of line, metric value exceeds maximum
```

This warning message occurs when `dsilog` doesn't log any data for a particular line of input. This happens when the input doesn't fit the format expected by the DSI log files, such as when blank or header lines are present in the input or when a metric value exceeds the specified precision. In this case, the offending lines will be skipped (not logged). `dsilog` will resume logging data for the next valid input line.

# General Error Messages

| Error | Explanation |
|---|---|
| -3 | Attempt was made to add more classes than allowed by max-class. |
| -5 | Could not open file containing class data. |
| -6 | Could not read file. |
| -7 | Could not write to file. |
| -9 | Attempt was made to write to log file when write access was not requested. |
| -11 | Could not find the pointer to the class. |
| -13 | File or data structure not initialized. |
| -14 | Class description file could not be read. |
| -15 | Class description file could not be written to. |
| -16 | Not all metrics needed to define a class were found in the metric description class. |
| -17 | The path name of a file in the log file set is more than 1024 characters long. |
| -18 | Class name is more then 20 characters long. |
| -19 | File is not log file set root file. |
| -20 | File is not part of a `lod` file set. |
| -21 | The current software cannot access the log file set. |
| -22 | Could not get shared memory segment or id. |
| -23 | Could not attach to shared memory segment. |
| -24 | Unable to open log file set. |
| -25 | Could not determine current working directory. |

| Error | Explanation |
|---|---|
| -26 | Could not read class header from class data file. |
| -27 | Open of file in log file set failed. |
| -28 | Could not open data class. |
| -29 | `Lseek` failed. |
| -30 | Could not read from log file. |
| -31 | Could not write on log file. |
| -32 | Remove failed. |
| -33 | `shmctl (REM_ID)` failed. |
| -34 | Log file set is incomplete: root or description file is missing. |
| -35 | The target log file for adding a class is not in the current log file set. |

# Index


**A**

accessing DSI data, 76, 77
action, 65
alarm
  generator, 65
  processing, 65
alarm definition
  DSI metric name in, 64
alarmdef
  changes, 65
alarmdef file, 64
alarms
  configuring, 65
  defining, 64
alert, 65

**C**

capacity, 42
  statement, 46
changing
  alarmdef file, 65
  class specifications, 75
class
  capacity, 42, 46
  definitions, 31
  description, 23
  description defaults, 33
  ID requirements, 34
  index interval, 36
  label, 35
  listing with sdlutil, 78
  name requirements, 34
  records per hour, 44
  roll interval, 36
  statement, 34
  syntax, 34
class specification
  changing, 75
  compiling, 86, 90, 98
  creating, 85, 89, 93
  metrics definition, 48
  recreate using sdlutil, 78
  testing, 70
compiler output, sample, 61
compiling class specification, 86, 90, 98
configuring alarms, 65
conventions
  typographical, 9
creating
  class specification, 18
  log files, 23

**D**

data
  accessing, 76, 77
  collecting, 18
  exporting, 76
  logging, 18
  managing, 78
data source integration
  error messages, 110
  examples of using DSI, 82
  how it works, 17
  overview, 16
  testing, 70
decimal places, metrics, 53
defaults
  class description, 33
  class label, 35
  delimiters, 54, 69
  maximum metric value, 52
  metrics, 49
  records per hour, 44
  separator, 54
  separators, 69
  summarization level, 44, 66
delimiters, 54, 69
displaying data in OV Performance Manager, 77
DSI metrics in alarm definitions, 64
DSI. *See also* data source integration
dsilog
  input to, 66
  logging process, 66, 86
  syntax, 66
  writing a script, 83
dsilog program, 26

**E**

error messages, 110
escape characters, 35, 36, 50
examples of using DSI, 82
  logging sar data for several options, 100
  logging sar data from one file, 88
  logging sar data from several files, 93
  logging the number of system users, 107
  logging vmstat data, 85
  writing a dsilog script, 83
excluding data from logging, 73

# Index

exporting logged data, 76, 87
extract program, 76

**F**

fifo, 66
files
  alarmdef, 64
format file, 66, 73

**I**

index interval, class, 36
input to dsilog, 66

**K**

kernel parameters, 66

**L**

label
  class, 35
  metrics, 50
length text metrics, 54
log file
  size, controlling, 42
log file sets
  defining, 23
  listing with sdlutil, 78
  naming, 31
  rolling, 42
log files
  DSI, 17
  organization, 23
logged data, exporting, 76
logging data
  run dsilog program, 26
logging process, 66, 86
  dsilog, 86
  testing, 70

**M**

managing DSI data, 78
mapping incoming data to specification, 73
maximum value, metrics, 52
metrics
  defaults, 49
  definition, 48
  description, 23
  id requirements, 48
  keyword, 48
  label, 50
  label requirements, 50
  listing with sdlutil, 78
  name requirements, 48
  order, 48
  precision, 53
  reusing name, 48, 49
  summarization method, 51
  text, 54
metrics in alarm definitions, 64
minimum value, metrics, 52
modify class specification file, 75

**N**

named pipe, 66
Network Node Manager, 65
numeric format option, 73
numeric metrics, format file, 73

**O**

order of metrics, changing, 73
OV Operations, 65
OV Performance Manager
  displaying DSI data, 77
overview
  data source integration, 16

**P**

piping data to dsilog, 66
precision, 53
  metrics, 53
processing alarms, 65

**R**

records per hour, 44, 66
reusing metric names, 48, 49
roll
  action, 36
  example of action, 38
  interval, 36

**S**

sample compiler output, 61
sar
  example of logging sar data for several options, 100
  example of logging sar data from one file, 88
  example of logging sar data from several files, 93
scopeux, 17

SDL
  prefix for class specification error
      messages, 59
sdlcomp, 86
  compiler, 86
sdlcomp compiler, 22
sdlgendata, 70
sdlutil, 78, 87
  syntax, 79
sending alarm information, 65
separator, 54
separators, 69
SNMP traps, 65
starting logging process, 66
statistics, listing with sdlutil, 78
summarization level, 66
  default, 44
summarization method, 51
summarized by option, 51
syntax
  dsilog, 66
  export, 76
  sdlutil, 79

**T**

testing
  class specification, 70
  logging process, 70
text metrics
  format file, 73
  specifying, 54
timestamp, 49
  suppressing, 66
troubleshooting sdlcomp, 63

**U**

UNIX kernel parameters, 66
UNIX timestamp, 49
utilities, sdlutil, 78

**V**

version information, displaying, 78
vmstat
  example of logging vmstat data, 85

**W**

who word count example, 107
writing a dsilog script, 83
  problematic dsilog script example, 83
  recommended dsilog script example, 83

# Index