Oracle Linux 9

Collecting and Analyzing Metrics With Performance Co-Pilot

G23059-02
June 2025

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G23059-02

Contents

Preface

Oracle Linux 9: Collecting and Analyzing Metrics With Performance Co-Pilot describes how to install and use Performance Co-Pilot (PCP) to collect performance metrics that can be used to monitor and diagnose system and network performance issues on Oracle Linux servers.

Documentation License

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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1

About Performance Co-Pilot

Performance Co-Pilot (PCP) collects OS and network metrics that you can use to diagnose performance issues. PCP provides a monitor host that you can use to send requests for metrics and logs to a pair of collector host services that are installed on each Oracle Linux system that you monitor.

> **Note:**
>
> PCP also provides metrics and other performance-related information that were previously provided by the Oracle OSWatcher Black Box (OSWbb) feature, as described in Oracle Linux 8: Monitoring and Tuning the System.

2
Installing and Starting PCP

Install the `pcp` package, and supplementary tools, on Oracle Linux 9.

Before installing the `pcp-oracle-conf` package, enable the `ol9_addons` yum repository. For more information, see Oracle Linux: Managing Software on Oracle Linux.

1. Install the `pcp-oracle-conf`, `pcp`, `pcp-system-tools`, and `pcp-gui` packages by using the `dnf` command:

   ```
   sudo dnf install pcp-oracle-conf pcp-system-tools pcp-gui
   ```

2. Enable and start the Performance Metrics Collector Daemon (`pmcd`) and Performance Metrics Logger (`pmlogger`) collector host services:

   ```
   sudo systemctl enable --now pmcd pmlogger
   ```

The `pcp` package and supplementary tools are installed. The `pmcd` and `pmlogger` are also running.

3
Stopping PCP

Stop the `pmcd` and `pmlogger` services to temporarily or permanently halt data collection.

Before halting or disabling the Performance Metrics Collector Daemon (`pmcd`) and Performance Metrics Logger (`pmlogger`) collector host services, verify that they're running:

```
sudo systemctl status pmcd pmlogger
```

1. To temporarily halt data collection, stop the `pmcd` and `pmlogger` services:

   ```
   sudo systemctl stop pmcd pmlogger
   ```

2. To halt data collection for an indefinite period and ensure that they don't start again automatically when the system boots, fully disable them:

   ```
   sudo systemctl disable --now pmcd pmlogger
   ```

The `pmcd` and `pmlogger` services have halted data collection either temporarily or permanently depending on the commands used.

> **Note:**
>
> For more information about masking and unmasking services to prevent scripts from restarting disabled system services, see Oracle Linux 9: Managing the System With systemd.

4
Getting Started With PCP

Review information gathered by the PCP host services and configuring the frequency with which metrics are collected.

If the `pcp-oracle-conf` package is installed then the only metrics collected by the `pmlogger` service are those listed in the `/var/lib/pcp/config/pmlogger/config.ora` configuration file.

If PCP has been installed without the `pcp-oracle-conf` package, review the `/var/lib/pcp/config/pmlogger/config.default` configuration file instead.

1. You can change the frequency with which metrics are collected in the same configuration file. For example, to increase the frequency from each minute to every 5 seconds, revise the file as follows:

   ```
   ...
   # It is safe to make additions from here on ...
   #

   log mandatory on every 5 seconds {
     filesys.free
     filesys.used
     ...
   }
   ```

   All the archives that the `pmlogger` service generates are stored in the `/var/log/pcp/pmlogger/`*`hostname`* directory. For more information, see the `pmlogconf(1)` manual page.

2. To verify the PCP configuration at the time that `pmlogger` collected specific performance metrics, use the `pcp` command:

   ```
   sudo pcp -a 20250113.0.xz
   ```

The frequency with which metrics are gathered was adjusted and verified.

5

PCP Command Reference

This table provides information about PCP commands.

Action	Command	Description
Performance metrics reporting tool.	`pmrep`	Generates reports from data collected by the Performance Metrics Collector Daemon (`pmcd`) service.
Arbitrary performance metrics valude dumper.	`pmval`	Outputs the current or archived values for a specific performance metric from the `pmcd` service.
Review detailed information about a specific performance metric.	`pminfo`	Outputs the current or archived values for a specific performance metric from the `pmcd` service.
High level system performance overview.	`pmstat`	Outputs a one line system performance overview on a timed interval. By default, a new line is output every five seconds.
Compared archived logs and reports differences.	`pmdiff`	Outputs the differences from two archived logs created by the Performance Metrics Logger (`pmlogger`) service.
Output collected or live performance data as plain text.	`pmdumptext`	Generates an ASCII format plain text file containing information collected by the `pmcd` service.
Output internal information for an existing log archive.	`pmdumplog`	Outputs metadata for archived data collected by the `pmlogger` service.
Run `dstat` commands within PCP.	`pcp dstat`	Provides compatibility for legacy scripts and troubleshooting procedures that rely on the deprecated `dstat` utility.

Reviewing Live Performance Metrics in Real Time

Use the `pmrep` and `pmval` commands to review live performance metrics.

To monitor all the outgoing metrics from the `eth0` network interface in real time, use the `pmrep` command:

```
sudo pmrep -i eth0 -v network.interface.out
```

To monitor live hard drive operations for each partition with a two second interval, use the `pmval` command:

```
sudo pmval -t 2sec -f 3 disk.partitions.write
```

Reviewing Recorded Performance Metrics

Use the `pmdumptext`, `pmstat`, and `pmdiff` commands to review metrics collected by the `pmlogger` service.

All the archives that the `pmlogger` service generates are stored in the `/var/log/pcp/pmlogger/`*`hostname`* directory. Navigate to this directory to review the archived performance metrics.

The `pmstat` command can provide system performance metrics in a format similar to that produced by the `sar` command. For example, to review performance metrics averaged over a 10 minute interval between 09:00 and 10:00 on a specific date:

```
sudo pmstat -t 10m -S @09:00 -T @10:00 -a 20250113.0.xz
```

To compare the metrics between two time periods, use the `pmdiff` command. For example, to compare the metrics between 02:00 and 03:00 on one day to the metrics between 09:00 and 10:00 on a different day:

```
sudo pmdiff -S @02:00 -T @03:00 -B @09:00 -E @10:00 20250114.0.xz
20250113.0.xz
```

Reviewing Details About Recorded Performance Metrics

Use the `pminfo` command to review detailed information about specific performance metrics.

To review detailed information about a specific metric, use the `pminfo` command. For example, to review details about free memory:

```
sudo pminfo -df mem.freemem -a 20250113.0.xz
```

Validating System Status When Performance Metrics Were Captured

Use the `pmdumplog` and `pminfo` commands to validate system status when performance metrics were captured.

To verify the host, timezone, and time period that an archive containing performance metrics contains, use the `pmdumplog` command:

```
sudo pmdumplog -L 20250113.0.xz
```

To review a list of every enabled performance metric, use the `pminfo` command:

```
sudo pminfo -a 20250113.0.xz
```

Running `dstat` With PCP

Use the `pcp dstat` command to review performance metrics collected by PCP.

The `dstat` utility that was provided in previous Oracle Linux releases is no longer being actively developed. Instead, Performance Co-Pilot (PCP) provides many of the same functions for diagnosing system performance problems.

To review the command options provided for the `pcp dstat` command, run the following command:

```
pcp dstat -h


Usage: pcp-dstat [-afv] [options...] [delay [count]]
Versatile tool for generating system resource statistics

Dstat options:
-c, --cpu             enable cpu stats
-C 0,3,total          include cpu0, cpu3 and total
-d, --disk            enable disk stats
-D total,sda          include sda and total
...
```

By default, running the command without any other options displays statistics about CPU, disk, network, page, and system:

```
pcp dstat


You did not select any stats, using -cdngy by default.
----total-usage---- -dsk/total- -net/total- ---paging-- ---system--
usr sys idl wai stl| read  writ| recv  send|  in   out | int   csw
0   0 100   0   0|   0     0 | 198B  719B|   0     0 | 156   254
0   0 100   0   0|   0    12k|  66B  302B|   0     0 | 160   264
0   0  99   0   0|   0     0 | 132B  384B|   0     0 | 136   219
...
```

As with the previous iteration of the tool, `pcp dstat` generates a running list of metrics and statistics in real time. To stop the process, press the `Ctrl` + `C` keys.

You can use different options to narrow the information output from the `pcp dstat` command command. For example, to display the metrics for CPU 1 only, run the following command:

```
pcp dstat -c -C 1,total


-----cpu1-usage---------total-usage----
usr sys idl wai stl:usr sys idl wai stl
0   0 100   0   0:  0   0 100   0   0
```

```
1   0 100   0   0:  0   0  99   0   0
0   0 100   0   0:  0   0 100   0   0
...
```

Similarly, to display only network statistics of a specific interface, such as `ens3`, and including totals, you would run the following command:

```
pcp dstat -n -N ens3,total
```

```
--net/ens3---net/total-
recv  send: recv  send
66B  350B:  66B  350B
66B  190B:  66B  190B
66B  198B:  66B  198B
66B  198B:  66B  198B
...
```

To store any statistics that are being gathered into a file for later review, include the `-o` *outputfile* option in the command.

For example, to collect network statistics and save the information in the `/tmp/netstat-log` file, and use the `-f` option to output full information, run the following command:

```
pcp dstat -n -f -o /tmp/netstat-log
```

```
--net/ens3-----net/lo--
recv  send: recv  send
66B  358B:   0     0
66B  174B:   0     0
66B  190B:   0     0
341B  419B:   0     0
66B  190B:   0     0
66B  190B:   0     0
66B  190B:   0     0
```

The output is saved in plain-text format. To review the contents of the `/tmp/netstat-log` file, run the following command:

```
cat /tmp/netstat-log
```

```
...
"Host:","hostname",,,,"User:","user"
"Cmdline:","pcp-dstat -n -f -o /tmp/netstat-log",,,,"Date:","date"
"net/ens3",,"net/lo",
"net/ens3:recv","net/ens3:send","net/lo:recv","net/lo:send"
65.934,357.641,0,0
66.000,173.999,0,0
66.000,190.001,0,0
340.992,418.991,0,0
66.001,190.004,0,0
```

```
66,190,0,0
66.000,189.999,0,0
```