



[www.systemdatarecorder.org](http://www.systemdatarecorder.org)

**System Data Recorder**  
**User Guide**  
ver 0.71



Copyright ©2005-2010 Stefan Parvu and Contributors. All rights reserved.

This document is free; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This document is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this document; if not, write to the Free Software Foundation, Inc., 675 Mass Ave, Cambridge, MA 02139, USA. (<http://www.gnu.org/copyleft/gpl.html>)



# Credits

System Data Recorder is a open source project, started around 2005. Some ideas went into SDR as a frustration using other types of performance monitoring systems, some other simple ended up as being important and useful. During 2007 concepts from Guerrilla Capacity Planning of Dr. Neil Gunther made the foundation of SDR. Many people contributed ideas, suggestions over the time. To all contributors, many thanks, for your support !

Nothing is more important than being consistent and correct. Many thanks to Dr. Neil Gunther, for his patience and guidance over years in advising, reviewing and correcting SDR.

Special thanks to my current employer, Sun Microsystems Finland , which supported and trained me to become a System Administrator. Thanks as well to Brendan Gregg, Jim Mauro and many others which offered their help and answered many of my questions.

Finally, thanks to L<sup>A</sup>T<sub>E</sub>Xcommunity for keeping alive the project over the years. The current manual has been prepared using the professional L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> document processing system.



# Contents

<b>Credits</b>	<b>v</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 Release Notes</b>	<b>3</b>
2.1 Version 0.71 . . . . .	3
2.1.1 Recording . . . . .	3
2.1.2 Reporting . . . . .	4
<b>3 Installation</b>	<b>5</b>
3.1 Requirements . . . . .	5
3.1.1 Recording . . . . .	5
3.1.2 Reporting . . . . .	6
3.2 Installing SDR . . . . .	7
3.3 Upgrading SDR . . . . .	10
3.4 Uninstalling SDR . . . . .	11



# Chapter 1

## Introduction

After more than 20 years of computer business we still lack of consistent performance monitoring between different operating systems, each system deploying its own type of monitoring and data collection. This makes difficult to have consistent data collection over long periods of time, from different systems. Some alternatives, Universal Measurement Architecture, were discussed and proposed but unfortunately nothing came up as a final solution. Today, majority of the IT companies require you to buy or download a separately software which records and stores data from different operating systems and applications. In future such things can be delivered as part of the operating system, making uniform the process of collection and analysis between operating systems. This is in general possible for UNIX systems which are similar with each other, since all are POSIX systems and follow similar industry standards, like The Open Group.

System Data Recorder, SDR, could easily be used to deliver consistent data collection for many operating systems. The main idea behind SDR is to deploy a number of light recorders which collect and store various metrics from operating system: cpu, memory, disk or network usage over a long period of time without disrupting the production business. The recording process is done very simple, sampling over a period of time, storing several performance metrics. The recorded data is stored as plain ASCII data, easy to be accessed by any 3rd party system or other applications. The main idea is to have the data collection process standard between operating systems: Solaris, Linux, BSD. SDR looks like a blackbox where all system data is stored and can be easily sent for analysis. Having access to raw data makes SDR simple to use and simple to understand in a matter of minutes. The raw data will help us in developing a simple capacity planning setup for our site.

Certain monitoring systems use the concept of agentless recording, a system which runs on a centralized machine and executes via SSH or RSH operating system commands or custom probes. Example here: HP SiteScope. In contrast with

UMA, a 1997 project driven by the Open-Group was trying to standardize the performance measurement process. Majority of the computer vendors found this not important and with no financial returns therefore the project failed

such systems, SDR tries to stay simple and clear: list and define all recorders used to collect the performance data and store somewhere this set of data data, which anyone can easily access it and analyze it. Each recorder requires to be installed on every system we plan to collect data from.

A probe or simple name it a recorder, is defined as a light probe developed in KSH, Perl or even C language, which can directly talk and extract via Kernel Statistics interface, if available, operating system metrics. As well the probe can interact directly with a userland process and obtain the required metrics. This should happen without creating additional load or impact anyhow the execution of the measured production environment. Each recorder should be capable of accessing operating system interfaces without calling additional utilities and display its data in the following manner:

```
timestamp : metric1 : metric2: ... : metricN
```

where timestamp should be defined as Unix time or POSIX time and metricN are the values collected from OS or application.

The following chapters will walk over the release notes, the installation process and the way we setup and use the software.

# Chapter 2

## Release Notes

The release notes for System Data Recorder, including recording and reporting modules.

### 2.1 Version 0.71

The current version of SDR is 0.71. This release is supported on Solaris 10 and OpenSolaris operating systems only. A total of 19 change requests were recorded during 0.71 release. Please visit SDR Bugzilla for a complete list of all defects and enhancements.

#### 2.1.1 Recording

1. sysrec:

- CR 11 sysrec records negative memory usage
- CR 8 sysrec should take into consideration ZFS ARC consumer

2. hdwrec:

- CR 24 missing CPU information
- CR 12 hdwrec incorrect parse of number of physical disks installed

3. jvmrec:

- support for Solaris local zones
- SMF manifest name fix

4. corerec:

- support for SPARC VI, VII cpus
- SMF manifest name fix

## 2.1.2 Reporting

### 1. generic:

- CR 31 Support for IE 5,6,7
- CR 32 SDR Perl Memory leak in Perl 5.10 on Solaris 10 with %ENV

### 2. wlanalyzer:

- new workload analyzer utility, based on Perl
- calculates throughput for your application
- various pattern and count URI matches
- calculates service time

### 3. binaries:

- perl 5.10.1
- RRD 1.4.2
- R 2.9.2
- PDQ 5.0.3

# Chapter 3

## Installation

This chapter lists the product requirements and the installation notes for SDR.

### 3.1 Requirements

Before running SDR, make sure all product requirements are satisfied by checking all your servers, where you plan to install the software. SDR requires to be installed on each server you plan to collect data from and one additional server, where you plan to keep all recorded data, the reporting server.

#### 3.1.1 Recording

##### Solaris

SDR recording module operates on Solaris 10 Update 6+ X86-64 or SPARC platforms and on OpenSolaris 2009.06. We have been testing the software on Solaris 10 Update 6+ both SPARC and X86-64. Solaris 9 is currently not supported because of missing SMF, Zones modules. Certain recorders are working on the Solaris 9 release.

SDR is currently being ported to FreeBSD and RedHat

1. Generic  
Memory: 64MB RAM. Disk Space: 200KB default installation, no raw data; to keep 3 months raw data per server 1GB is required
2. Operating System  
Solaris 10U6+, OpenSolaris, global or local zone
3. Virtualization  
Solaris 10 packages: SUNWzoner, SUNWzoneu
4. Ksh  
Solaris 10 package: SUNWcsu

5. Perl

Solaris 10 packages:

SUNWperl584core, SUNWperl584usr, SUNWperl584man

6. Java 5 or 6

Solaris 10 packages:

SUNWj5cfg, SUNWj5dev, SUNWj5dmo, SUNWj5dmx,

SUNWj5dvx, SUNWj5man, SUNWj5rt, SUNWj5rtx

SUNWj6cfg, SUNWj6dev, SUNWj6dmo, SUNWj6dmx,

SUNWj6dvx, SUNWj6man, SUNWj6rt, SUNWj6rtx

### 3.1.2 Reporting

These are the product requirements for SDR Reporting module for all supported operating systems.

#### **FreeBSD, RedHat, Solaris**

SDR reporting module can be installed under FreeBSD, RedHat or Solaris based systems. Currently the reporting module has been tested under Solaris 10 Update 8 x86-64 and SPARC.

1. Generic

Memory: 128MB RAM. Disk Space: 700MB default installation; data collected: 2MB/day per server

2. Operating System

Solaris 10 U6+ or OpenSolaris 2009.06

## 3.2 Installing SDR

In order to operate with SDR you will need to install the recording package on all your servers you plan to collect data from. You need as well to configure how each server's data will be stored and the data retention policy: how many days you plan to keep data on those servers and finally a last step setting up a reporting server, a place you will store the recorded data over time.

This is the main installation procedure, in setting up the SDR Recording module. Execute the following steps, on each physical server:

Make sure you read the Upgrade section if you have already installed SDR

### 1. SDR package:

```
$ wget \
  http://www.systemdatarecorder.org/pkgs/sdr.071.solaris10.tar.gz

# cd /opt
# gzip -dc sdr.071.solaris10.tar.gz | tar xvf -

# cd /opt/sdr/bin
# grep 'VERSION:' *rec
corerec:# VERSION: 0.71
cpurec:# VERSION: 0.71
hdwrec:# VERSION: 0.71
jvmrec:# VERSION: 0.71
netrec:# VERSION: 0.71
nicrec:# VERSION: 0.71
sysrec:# VERSION: 0.71
zonerec:# VERSION: 0.71
```

SDR Installation procedure

### 2. setenv script:

Adjust `MONITOR_PATH` to point to your SDR installation path. Default is `/opt/sdr`

### 3. SAR:

SDR uses SAR, system activity reporter

```
# svcadm enable sar

# crontab -l sys
0,5,10,15,20,25,30,35,40,45,50,55 * * * * /usr/lib/sa/sa1
```

SDR Installation procedure

On Solaris systems, one very useful feature of SDR is SMF: the service management facility, a way to automatic restart your service in case of a failure, maintenance, etc. SDR uses SMF, by default, under Solaris 10 but you need to activate it. Below there are the steps used to enable SDR under SMF.

## 4. SMF Manifests:

```

# svcs -a | grep rec

# svcadm disable sysrec
# svcadm disable cpurec
# svcadm disable netrec
# svcadm disable nicrec
# svcadm disable zonerec
# svcadm disable jvmrec

# cd /opt/sdr/smf
# svccfg validate sysrec.xml
# svccfg validate cpurec.xml
# svccfg validate nicrec.xml
# svccfg validate netrec.xml
# svccfg validate zonerec.xml

# svccfg import sysrec.xml
# svccfg import cpurec.xml
# svccfg import nicrec.xml
# svccfg import netrec.xml
# svccfg import zonerec.xml

# svcadm enable sysrec
# svcadm enable cpurec
# svcadm enable nicrec
# svcadm enable netrec
# svcadm enable zonerec

```

SDR Installation procedure

## 5. Check recorders and raw data:

```

# svcs -a | grep rec
online      16:36:07 svc:/application/sysrec:default
online      16:37:43 svc:/application/cpurec:default
online      16:37:47 svc:/application/nicrec:default
online      16:37:52 svc:/application/netrec:default
online      16:37:56 svc:/application/zonerec:default

# ptree
[...]
3958 /usr/bin/perl -w /opt/sdr/bin/sysrec 60
3972 /bin/perl -w /opt/sdr/bin/cpurec 60
3980 /usr/bin/perl -w /opt/sdr/bin/nicrec 60
3989 /bin/perl -w /opt/sdr/bin/netrec 60
4000 /bin/ksh -p /opt/sdr/bin/zonerec 60
  4022 sleep 60

# pwd
/opt/sdr/log/raw
# ls -lrt
total 25
-rw-r--r--  1 root    root          342 Oct 31 16:39 cpurec.raw
-rw-r--r--  1 root    root          522 Oct 31 16:39 nicrec.raw
-rw-r--r--  1 root    root          324 Oct 31 16:39 netrec.raw
-rw-r--r--  1 root    root       7552 Oct 31 16:39 zonerec.raw

```

```
-rw-r--r--  1 root    root          263 Oct 31 16:40 sysrec.raw
```

SDR Installation procedure

Enable for each raw file, a entry for logadm to rotate the file at midnight and to compress the file. For this make sure you are superuser and modify the /etc/logadm.conf file or use logadm utility to add the entries.

#### 6. Enable logadm:

```
# SDR Monitoring
/opt/sdr/log/raw/sysrec.raw -c -p 1d -z 0
/opt/sdr/log/raw/cpurec.raw -c -p 1d -z 0
/opt/sdr/log/raw/nicrec.raw -c -p 1d -z 0
/opt/sdr/log/raw/netrec.raw -c -p 1d -z 0
/opt/sdr/log/raw/zonerec.raw -c -p 1d -z 0

# logadm -V
```

SDR Installation procedure

#### 7. root crontab:

```
# crontab -e

Add here logadm to be done at 00:05, everyday instead of 3AM
and move the raw data compressed into daily directories.

#
05 00 * * * /usr/sbin/logadm
10 00 * * * /opt/sdr/bin/raw2day
```

SDR Installation procedure

### 3.3 Upgrading SDR

If you have already installed SDR make sure you follow the instructions.

1. Backup config and hook files:

```
# cd /opt/sdr
# cp -pr bin bin.sdr.previous
```

SDR Upgrading procedure

2. Disable each service:

```
# svcadm disable sysrec
# svcadm disable cpurec
# svcadm disable nicrec
# svcadm disable netrec
# svcadm disable zonerec
```

SDR Upgrading procedure

3. SDR package:

```
$ wget \
  http://www.systemdatarecorder.org/pkgs/sdr.071.solaris10.tar.gz

# cd /opt
# gzip -dc sdr.071.solaris10.tar.gz | tar xvf -

# cd /opt/sdr/bin
# grep 'VERSION:' *rec
corerec:# VERSION: 0.71
cpurec:# VERSION: 0.71
hdwrec:# VERSION: 0.71
jvmrec:# VERSION: 0.71
netrec:# VERSION: 0.71
nicrec:# VERSION: 0.71
sysrec:# VERSION: 0.71
zonerec:# VERSION: 0.71
```

SDR Upgrading procedure

4. setenv script Restore MONITOR\_PATH to point to your SDR installation path. Default is /opt/sdr
5. Restore ftp, ssh2 hooks raw2day is used to automatically send data every night to a reporting server. If you use a 24hours time window update policy make sure you restore your raw2day hooks as they were found before the upgrade.

## 3.4 Uninstalling SDR

In order to remove SDR from your system make sure you login in the global zone of the physical machine where you have installed the software. Become root and disable all SDR recorders from SMF, if you are on Solaris and delete all its manifests. Make sure you delete the log directory, where SDR keeps its recorded data to make room for other applications.

### 1. Stop all recorders:

```
# svcadm disable sysrec
# svcadm disable cpurec
# svcadm disable nicrec
# svcadm disable netrec
# svcadm disable zonerec

# svcs -a | grep rec
disabled      16:43:55 svc:/application/sysrec:default
disabled      16:44:02 svc:/application/cpurec:default
disabled      16:44:05 svc:/application/nicrec:default
disabled      16:44:08 svc:/application/netrec:default
disabled      16:44:11 svc:/application/zonerec:default
```

SDR Uninstall procedure

### 2. Delete all SDR manifests:

```
# svccfg delete application/sysrec
# svccfg delete application/cpurec
# svccfg delete application/nicrec
# svccfg delete application/netrec
# svccfg delete application/zonerec

At this moment SMF does not know anymore about SDR

# svcs -a | grep rec
#

# cd /opt/sdr/log
# rm -rf daily raw
```

SDR Uninstall procedure

