

# Check and monitor CPU temperature

## WHAT?

Step-by-step explanation of how to configure CPU temperature monitoring.

## WHY?

You want to reduce your electricity bill and make sure that the hardware runs optimally.

## GOAL

Put in place a mechanism for checking and monitoring CPU temperature.

## EFFORT

20 minutes to install and configure the required tool.

## REQUIREMENTS

- Root permissions to install the required package
- The package sensors

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# 1 Checking and monitoring CPU temperature

## 1.1 Environment

This document applies to the following products and product versions:

- SUSE Linux Enterprise Server 15 SP3, 15 SP2, 15 SP1, 15 GA, 12 SP5, 12 SP4, 12 SP3
- SUSE Linux Enterprise Server for SAP Applications 15 SP3, 15 SP2, 15 SP1, 15 GA, 12 SP5, 12 SP4, 12 SP3
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- SUSE Linux Enterprise Real Time 15 SP3, 15 SP2, 15 SP1, 15 GA, 12 SP5, 12 SP4, 12 SP3

## 1.2 Introduction

Checking and monitoring CPU temperature has several benefits.

- Energy savings and cost reduction. When a CPU runs at full speed, it consumes more energy than when it is idling. Also, running CPUs cool is a critical cost factor, especially in data centers.
- Identifying processes that consume too much CPU power. Doing that can help to free your CPU resources and increase the CPU's responsiveness.
- Easier detection of cooling issues. If the CPU temperature reaches 80°C or higher, it indicates that there is a problem with the cooling system or the fan, or that the thermal paste was not applied correctly.
- A long-term reduction of the carbon footprint can be achieved by adjusting the cooling parameters.

Follow the instructions below to enable and perform CPU temperature checks.

## 1.3 Working with hardware sensors

To measure the CPU temperature, install and configure the `sensors` tool that can access and read the hardware sensors.

1. Install the required package:

```
zypper install sensors
```

2. To detect all the sensors in the system, run the following command as `root`:

```
# sensors-detect
```

When prompted to detect specific hardware monitoring chips, accept the default answer YES by pressing `y`. When finished, the script shows a summary of what chips were detected:

```
Now follows a summary of the probes I have just done.

Driver `coretemp':
  * Chip `Intel digital thermal sensor' (confidence: 9)

Driver `to-be-written':
  * ISA bus, address 0xa40
    Chip `ITE IT8686E Super IO Sensors' (confidence: 9)

Do you want to generate /etc/sysconfig/lm_sensors? (YES/no):
```

3. Confirm to generate the file `/etc/sysconfig/lm_sensors`. After confirmation, the script creates a `systemd` service (`/usr/lib/systemd/system/lm_sensors.service`) that is enabled by default.

Check the status of the `systemd` service:

```
sudo systemctl status lm_sensors
● lm_sensors.service - Initialize hardware monitoring sensors
   Loaded: loaded (/usr/lib/systemd/system/lm_sensors.service; enabled; vendor preset: disabled)
   Active: active (exited) since Fri 2021-09-10 16:57:55 CEST; 2min 23s ago
   Process: 32552 ExecStart=/usr/bin/sensors -s (code=exited, status=0/SUCCESS)
   Process: 32551 ExecStart=/sbin/modprobe -qab $BUS_MODULES $HWMON_MODULES (code=exited, status=0/SUCCESS)
   Main PID: 32552 (code=exited, status=0/SUCCESS)
   Tasks: 0
```

```
CGroup: /system.slice/lm_sensors.service
```

```
Sep 10 16:57:55 edison systemd[1]: Starting Initialize hardware monitoring sensors...  
Sep 10 16:57:55 edison systemd[1]: Started Initialize hardware monitoring sensors.
```

After you have completed these steps, your computer has detected all sensors and has started to monitor them.

## 1.4 Getting real-time temperature data

To obtain a snapshot of the current temperature, run the following command:

```
> sensors  
[...]  
Adapter: ACPI device  
temp1:      +16.8°C (crit = +18.8°C)  
temp2:      +27.8°C (crit = +119.0°C)  
temp3:      +29.8°C (crit = +119.0°C)  
  
nvme-pci-0700  
Adapter: PCI adapter  
Composite:  +36.9°C (low  = -273.1°C, high = +83.8°C)  
              (crit = +83.8°C)  
Sensor 1:   +36.9°C (low  = -273.1°C, high = +65261.8°C)  
Sensor 2:   +43.9°C (low  = -273.1°C, high = +65261.8°C)  
  
coretemp-isa-0000  
Adapter: ISA adapter  
Package id 0: +43.0°C (high = +82.0°C, crit = +100.0°C)  
Core 0:       +41.0°C (high = +82.0°C, crit = +100.0°C)  
Core 1:       +41.0°C (high = +82.0°C, crit = +100.0°C)  
Core 2:       +43.0°C (high = +82.0°C, crit = +100.0°C)  
Core 3:       +41.0°C (high = +82.0°C, crit = +100.0°C)  
Core 4:       +41.0°C (high = +82.0°C, crit = +100.0°C)  
Core 5:       +40.0°C (high = +82.0°C, crit = +100.0°C)
```

Run the command below to monitor temperature in real time:

```
> watch sensors
```

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