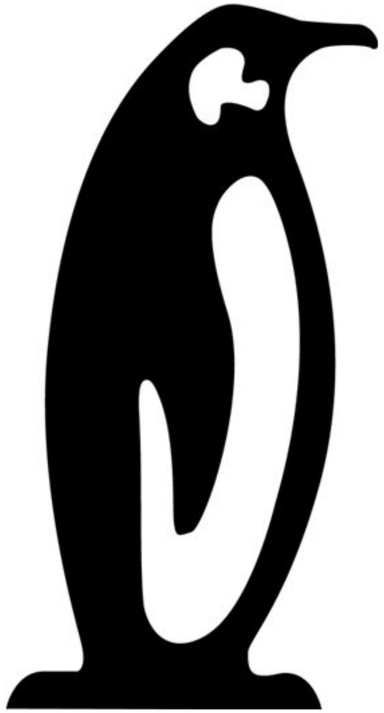


Linux Plumbers Conference

Vienna, Austria | September 18-20, 2024

Time based thermal governor (all theoretical)

Power Management and Thermal Control MC

Daniel Lezcano <daniel.lezcano@linaro.org>

LINUX PLUMBERS CONFERENCE | Vienna, Austria
Sept. 18-20, 2024

Step wise advantages

- Simple algorithm
  - +1 when temperature trend is raising up
  - -1 when temperature trend is dropping down
- Works just fine 👍

Step wise limitations

- Temperature takes time to stabilize when there are a lot of steps, jittering can be important
- Depending on the passive polling delay sampling
- Results in temperature overshot and undershot

Power allocator advantages

- Temperature is better stabilized than the step wise governor
- Based on PID loop

Power allocator disadvantages

- Complex logic, math involved
- Very hard to setup without a good knowledge of it
- Only for cooling devices with an energy model

Time / event based step wise

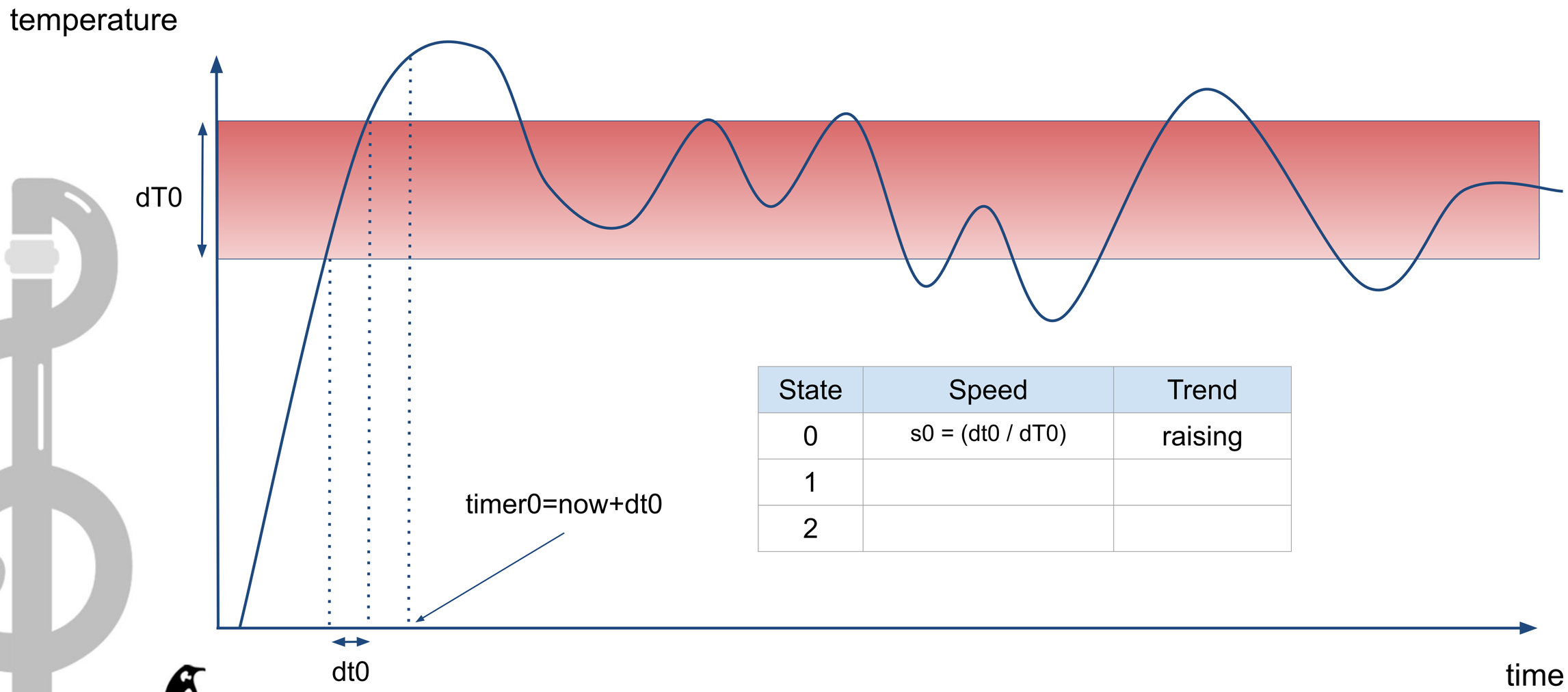
- Let’s try to get advantages from both approaches
- Simple
- Smooth stabilized temperature

Time / event based step wise

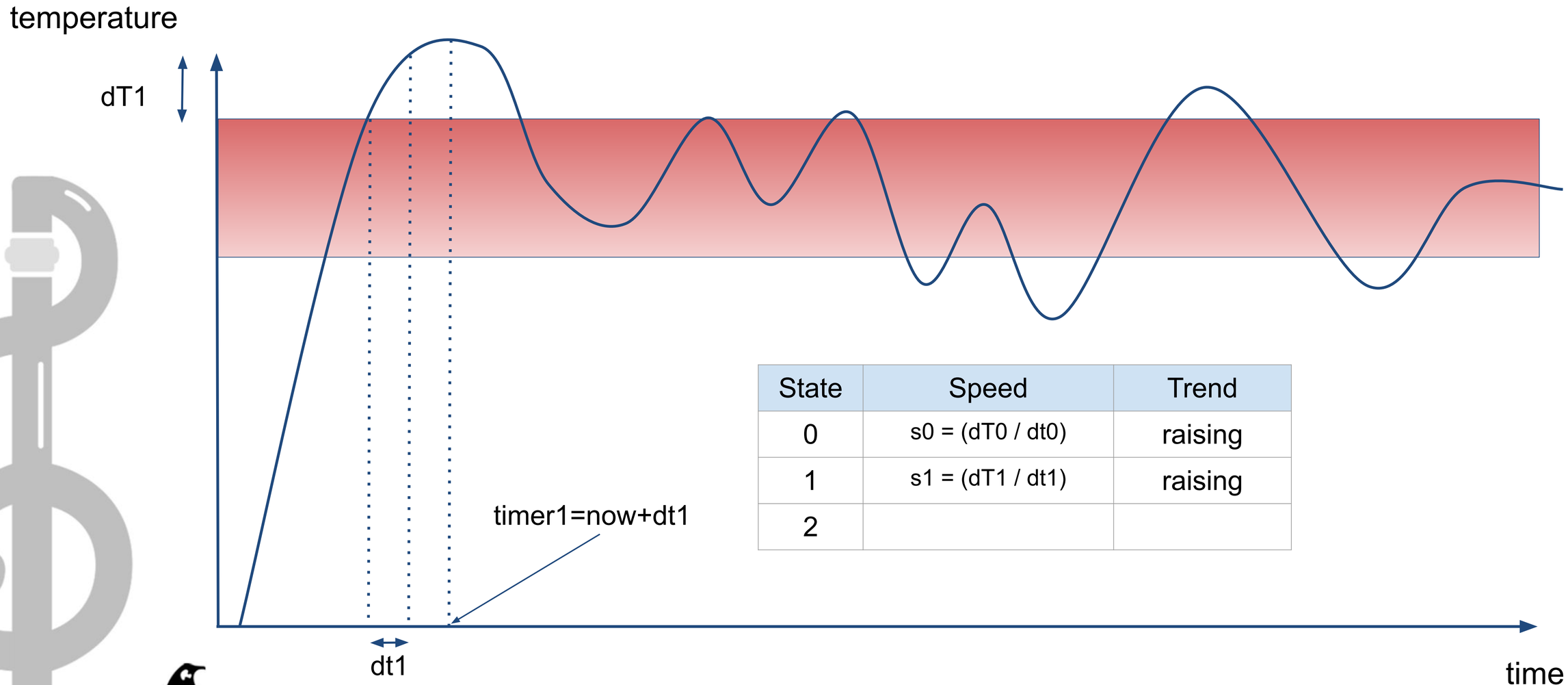
- We need a temperature speed estimation
- No more temperature at fixed sampling rate but pro-activity and reactivity
- No passive polling needed

Time / event based step wise

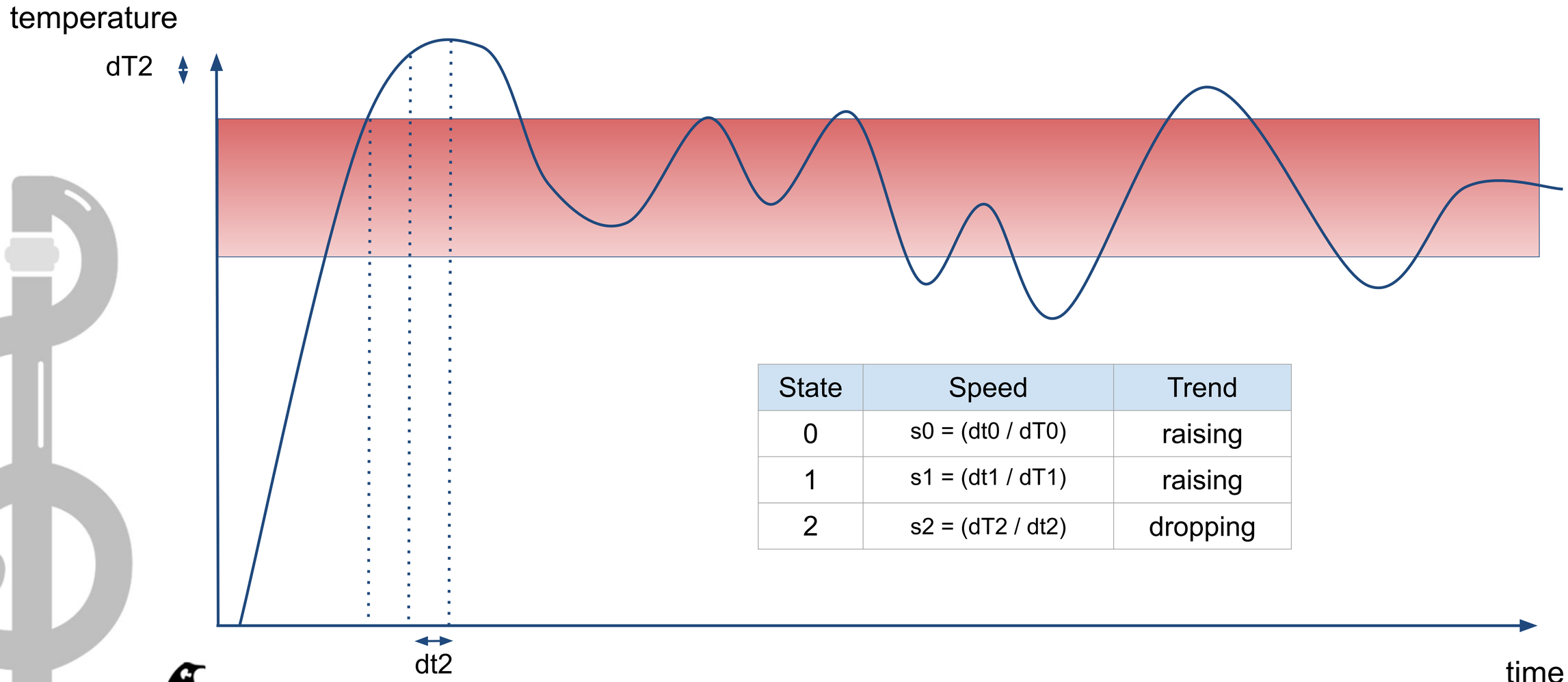
- Speed gives us an estimation of when will be reached the limit
- There is a speed per cooling device state



State	Speed	Trend
0	s0 = (dt0 / dT0)	raising
1		
2		



State	Speed	Trend
0	s0 = (dT0 / dt0)	raising
1	s1 = (dT1 / dt1)	raising
2		



State	Speed	Trend
0	s0 = (dt0 / dT0)	raising
1	s1 = (dt1 / dT1)	raising
2	s2 = (dT2 / dt2)	dropping

Time / event based step wise

- Assuming the temperature is in the hysteresis
- In the absolute, we want the average temperature speed equal to zero

Thought exercise

- speed average = (DT0 + DT1 + DT2) / (dt0 + dt1 + dt2) = 0
- dt0 + dt1 + dt2 is always > 0
- DT0 + DT1 + DT2 = 0
- To make the equality true, we need to introduce factors
- a.DT0 + b.DT2 + c.DT2 = 0

Thought exercise

- Finding a, b and c ?
- Repeat 3 times the speed measurements ?
- Use arbitrary values for two of the three factors ?

LPC 2024 - Overview

Conference Details

The Linux Plumbers Conference is the premier event for developers working at all levels of the plumbing layer and beyond.

Taking place on Wednesday 18th, Thursday 19th and Friday 20th of September, this year we will be both in person and remote (hybrid). However to minimize technical issues, we'd appreciate most of the content presenters being in-person.

The in-person venue is the Austria Center, Vienna, Austria.

Bruno-Kreisky-Platz 1, 1220 Wien, Austria

Unless specified otherwise, the conference information will be shared in Central European Summer Time (CEST, UTC+02:00, Europe/Vienna timezone).

Sponsorship opportunities

Linux Plumbers Conference would not be possible without our sponsors. Many thanks to all the great organizations that have supported Linux Plumbers Conference over the years.

New sponsorship opportunities are available for 2024! We hope that your organization will consider joining our growing list of amazing sponsors this year. Find out more here.

LPC 2024 - Overview

Conference Details

The Linux Plumbers Conference is the premier event for developers working at all levels of the plumbing layer and beyond. Taking place on Wednesday 18th, Thursday 19th and Friday 20th of September, this year we will be both in person and remote (hybrid). However to minimize technical issues, we'd appreciate most of the content presenters being in-person.Taking place on Wednesday 18th,

Taking place on Wednesday 18th, Thursday 19th and Friday 20th of September, this year we will be both in person and remote (hybrid). However to minimize technical issues, we'd appreciate most of the content presenters being in-person.

The in-person venue is the Austria Center, Vienna, Austria.

Bruno-Kreisky-Platz 1, 1220 Wien, Austria

Unless specified otherwise, the conference information will be shared in Central European Summer Time (CEST, UTC+02:00, Unless specified otherwise, the conference information will be shared in Central European Summer Time (CEST, UTC+02:00,
Europe/Vienna timezone).

Conference Details

The Linux Plumbers Conference is the premier event for developers working at all levels of the plumbing layer and beyond.

Linux Plumbers Conference

Vienna, Austria | September 18-20, 2024