Monitoring Sounds with Zabbix

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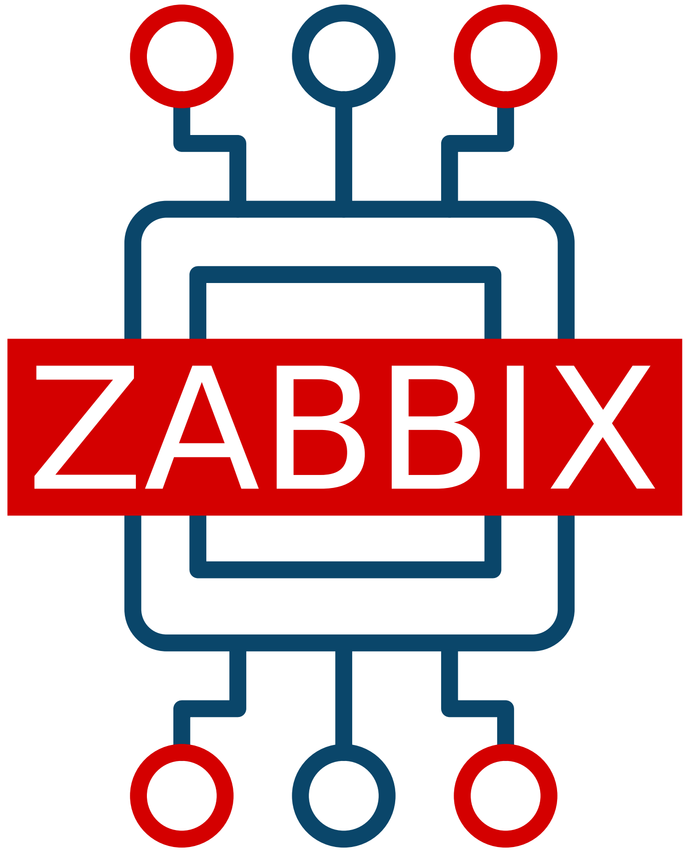
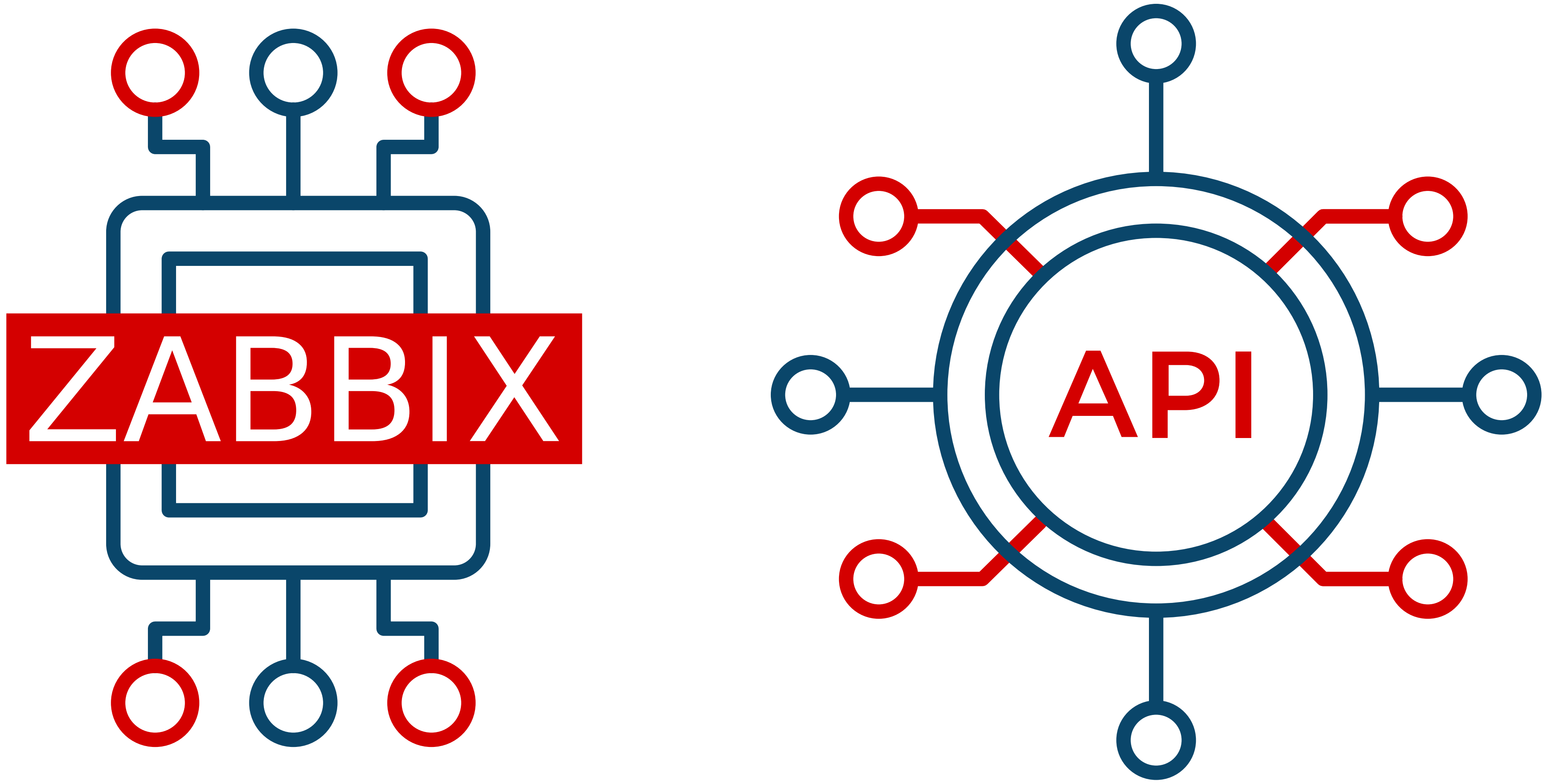
ZABBIX SUMMIT
OCTOBER 8 · 10, 2025
RIGA · LATVIA

I need to monitor it!

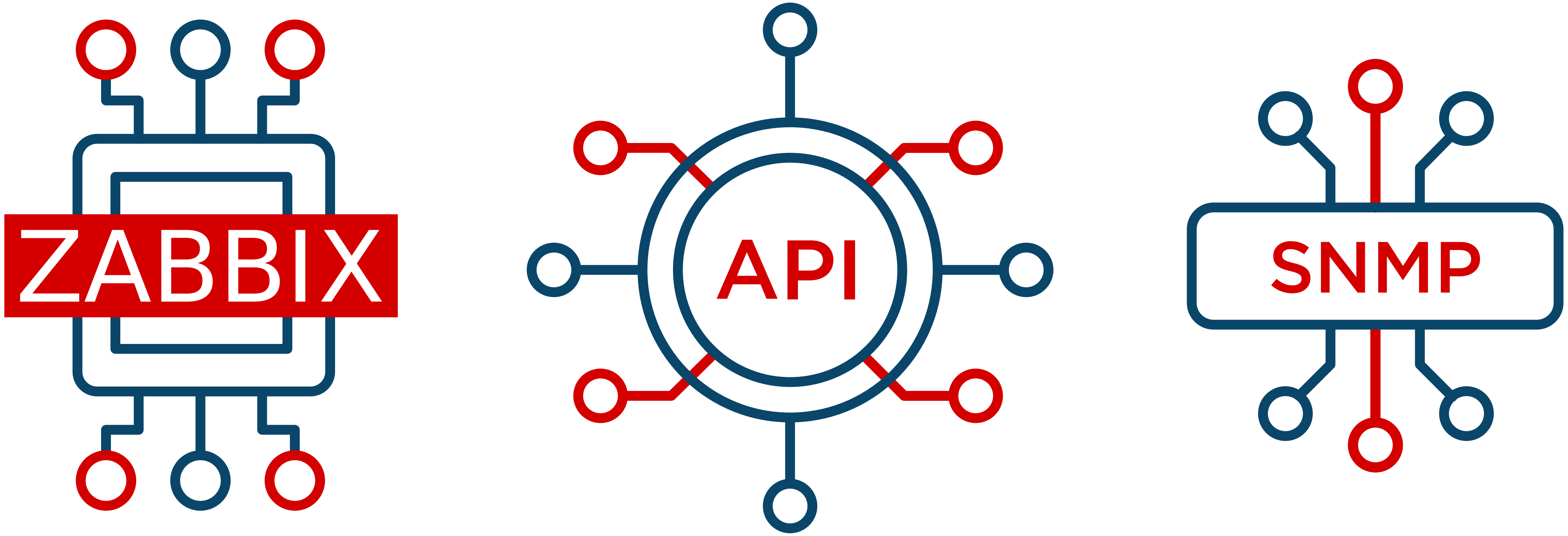
But how?



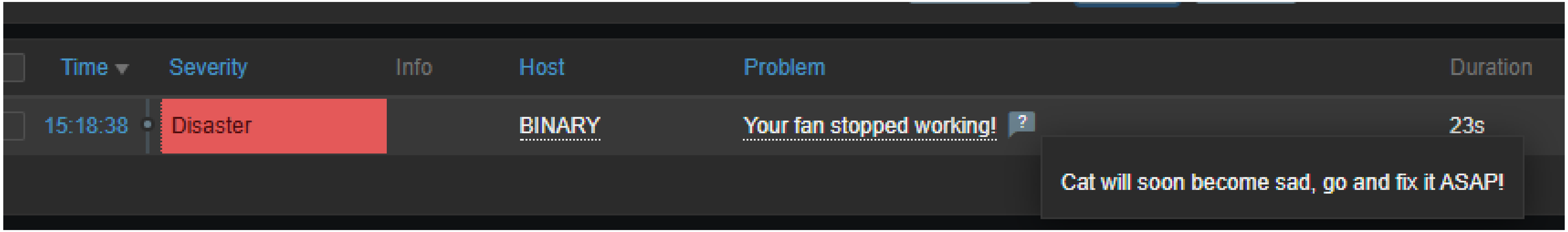
But how?



But how?

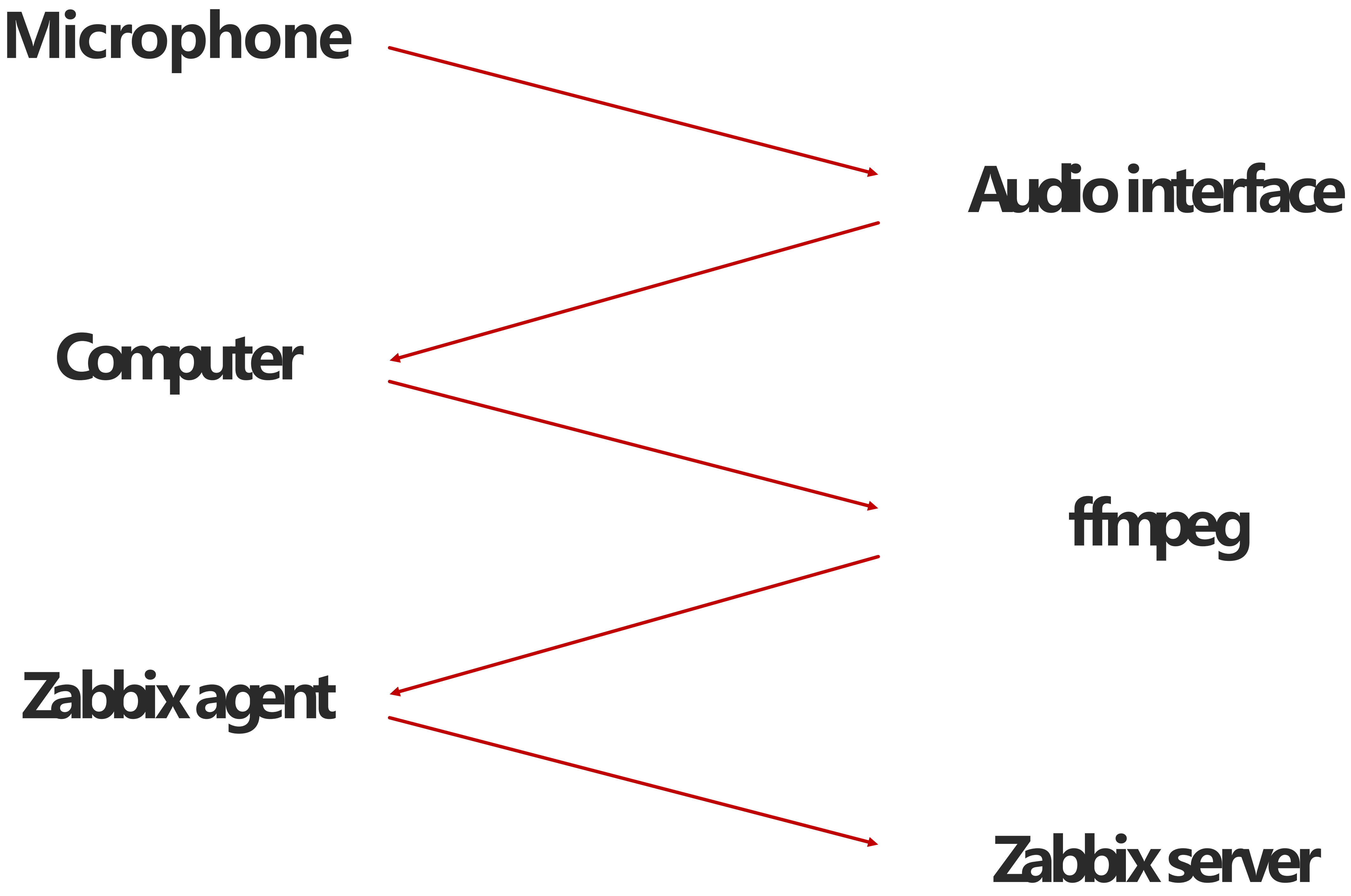


With the help of sounds!



Time
Severity
Info
Host
Problem
Duration
15:18:38
Disaster
BINARY
Your fan stopped working!
23s
Cat will soon become sad, go and fix it ASAP!

Setup


Microphone
Audio interface
Computer
ffmpeg
Zabbix agent
Zabbix server

Code

```
$ffmpegOutput = & "C:\ffmpeg\bin\ffmpeg.exe" -hide_banner -f dshow -i audio="Analogue 1 + 2 (2- Focusrite USB
Audio)" -t 12 -af "pan=mono|c0=c1,astats=metadata=1:reset=0" -f null - 2>&1
$ffmpegOutput -join "`n"
```

```
UserParameter=mic.astats.raw,powershell -NoProfile -ExecutionPolicy Bypass -File "C:\Program Files\Zabbix
Agent\zabbix_agentd.d\mic_astats_raw.ps1"
```

Output

ZABBIX 20 YEARS

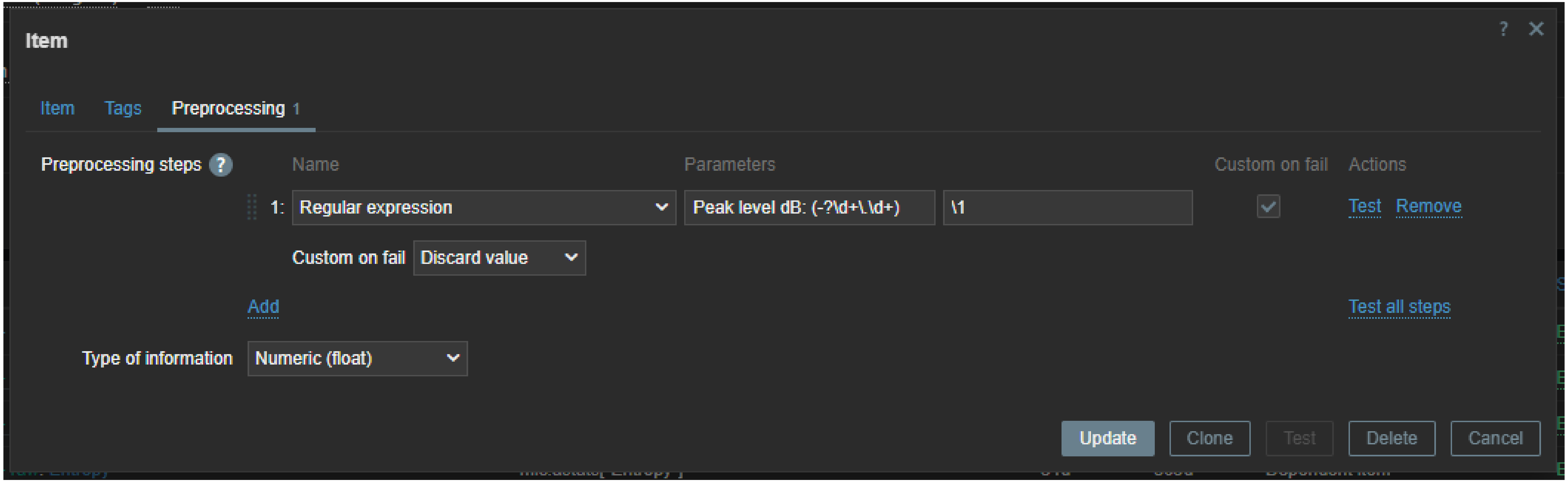
```
Windows PowerShell
PS C:\Users\User>
PS C:\Users\User> zabbix_agentd.exe -t mic.astats.raw
mic.astats.raw                                    [t|[aist#0:0/pcm_s16le @ 0000017dd7103180] Guessed Channel Layout
: stereo
Input #0, dshow, from 'audio=Analogue 1 + 2 (2- Focusrite USB Audio)':
  Duration: N/A, start: 1492317.613000, bitrate: 1411 kb/s
  Stream #0:0: Audio: pcm_s16le, 44100 Hz, stereo, s16, 1411 kb/s
Stream mapping:
  Stream #0:0 -> #0:0 (pcm_s16le (native) -> pcm_s16le (native))
Press [q] to stop, [?] for help
[Parsed_pan_0 @ 0000017dd715df00] Pure channel mapping detected: 1
Output #0, null, to 'pipe:':
  Metadata:
    encoder         : Lavf62.0.100
  Stream #0:0: Audio: pcm_s16le, 44100 Hz, mono, s16, 705 kb/s
    Metadata:
      encoder         : Lavc62.0.101 pcm_s16le
size=N/A time=00:00:00.50 bitrate=N/A speed=0.994x
size=N/A time=00:00:01.49 bitrate=N/A speed=1.47x
size=N/A time=00:00:01.99 bitrate=N/A speed= 1.3x
size=N/A time=00:00:02.49 bitrate=N/A speed=1.22x
size=N/A time=00:00:02.99 bitrate=N/A speed=1.17x
size=N/A time=00:00:03.49 bitrate=N/A speed=1.13x
size=N/A time=00:00:03.99 bitrate=N/A speed=1.11x
size=N/A time=00:00:04.49 bitrate=N/A speed=1.09x
size=N/A time=00:00:04.99 bitrate=N/A speed=1.08x
size=N/A time=00:00:05.49 bitrate=N/A speed=1.07x
size=N/A time=00:00:05.99 bitrate=N/A speed=1.06x
size=N/A time=00:00:06.49 bitrate=N/A speed=1.05x
size=N/A time=00:00:06.99 bitrate=N/A speed=1.05x
size=N/A time=00:00:07.49 bitrate=N/A speed=1.04x
size=N/A time=00:00:07.99 bitrate=N/A speed=1.04x
size=N/A time=00:00:08.49 bitrate=N/A speed=1.03x
size=N/A time=00:00:08.99 bitrate=N/A speed=1.03x
size=N/A time=00:00:09.49 bitrate=N/A speed=1.02x
size=N/A time=00:00:09.99 bitrate=N/A speed=1.02x
size=N/A time=00:00:10.49 bitrate=N/A speed=1.02x
size=N/A time=00:00:10.99 bitrate=N/A speed=1.02x
size=N/A time=00:00:11.49 bitrate=N/A speed=1.01x
size=N/A time=00:00:11.99 bitrate=N/A speed=1.01x
size=N/A time=00:00:12.00 bitrate=N/A speed=0.971x
[Parsed_astats_1 @ 0000017dd715d000] Channel: 1
[Parsed_astats_1 @ 0000017dd715d000] DC offset: 0.000010
[Parsed_astats_1 @ 0000017dd715d000] Min level: -2430.000000
[Parsed_astats_1 @ 0000017dd715d000] Max level: 3193.000000
[Parsed_astats_1 @ 0000017dd715d000] Min difference: 0.000000
[Parsed_astats_1 @ 0000017dd715d000] Max difference: 1101.000000
[Parsed_astats_1 @ 0000017dd715d000] Mean difference: 3.796523
[Parsed_astats_1 @ 0000017dd715d000] RMS difference: 20.270263
[Parsed_astats_1 @ 0000017dd715d000] Peak level dB: -20.224755
[Parsed_astats_1 @ 0000017dd715d000] RMS level dB: -51.060004
[Parsed_astats_1 @ 0000017dd715d000] RMS peak dB: -31.300967
[Parsed_astats_1 @ 0000017dd715d000] RMS trough dB: -68.507434
[Parsed_astats_1 @ 0000017dd715d000] Crest factor: 34.814682
[Parsed_astats_1 @ 0000017dd715d000] Flat factor: 0.000000
[Parsed_astats_1 @ 0000017dd715d000] Peak count: 2
```

Zabbix Server

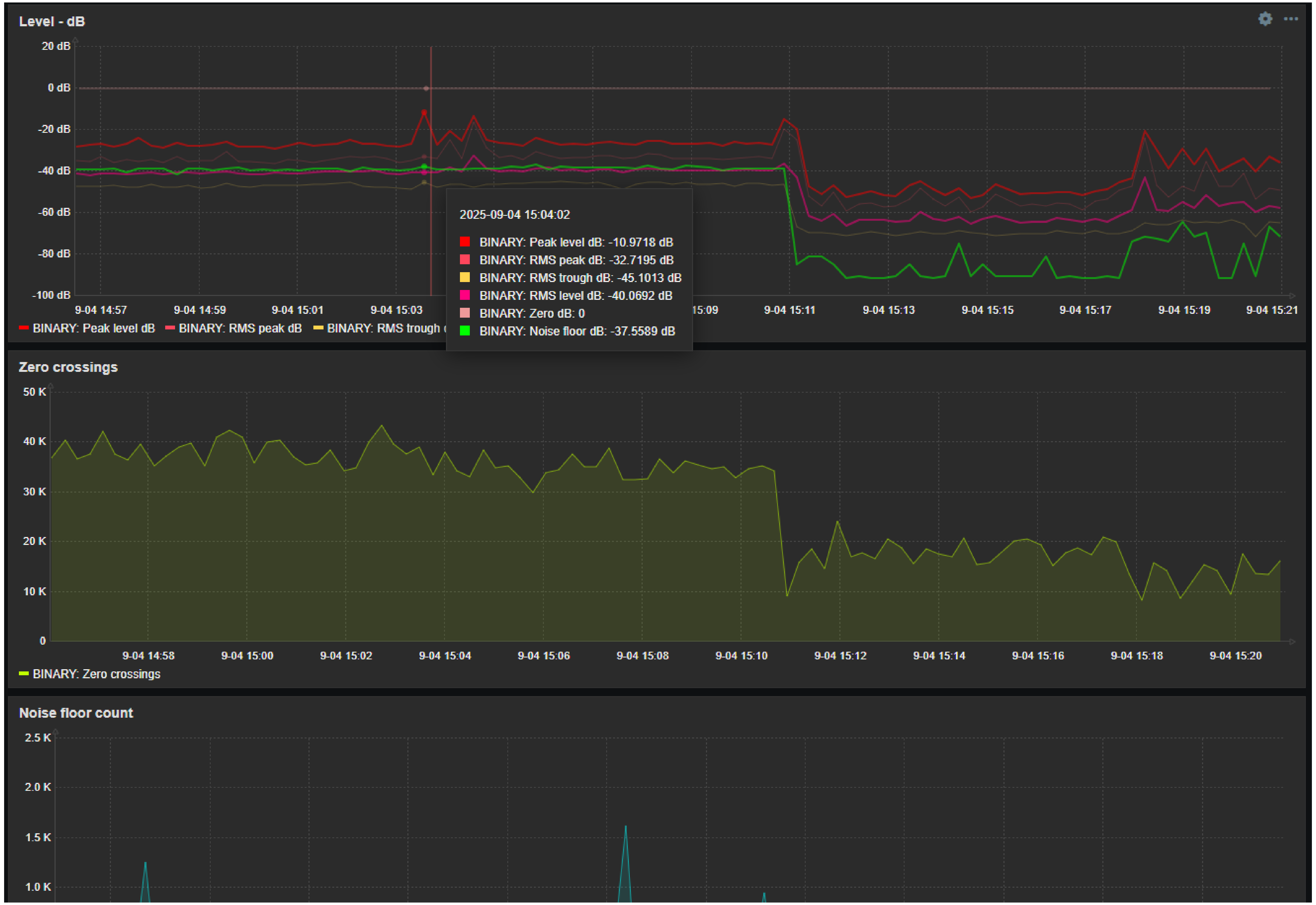
Name	Triggers	Key	Interval	History	Trends	Type	Status ▲	Tags
mic astats - raw		mic.astats.raw	15s	1d		Zabbix agent (active)	Enabled	
mic astats - raw: Crest factor		mic.astats["Crest factor"]		31d	365d	Dependent item	Enabled	
mic astats - raw: DC offset		mic.astats["DC offset"]		31d	365d	Dependent item	Enabled	
mic astats - raw: Entropy		mic.astats["Entropy"]		31d	365d	Dependent item	Enabled	
mic astats - raw: Flat factor		mic.astats["Flat factor"]		31d	365d	Dependent item	Enabled	
mic astats - raw: Max level	Triggers 1	mic.astats["Max level"]		31d	365d	Dependent item	Enabled	
mic astats - raw: Min level		mic.astats["Min level"]		31d	365d	Dependent item	Enabled	
mic astats - raw: Noise floor count		mic.astats["Noise floor count"]		31d	365d	Dependent item	Enabled	
mic astats - raw: Noise floor dB		mic.astats["Noise floor dB"]		31d	365d	Dependent item	Enabled	
mic astats - raw: Peak level dB		mic.astats["Peak level dB"]		31d	365d	Dependent item	Enabled	
mic astats - raw: RMS level dB		mic.astats["RMS level dB"]		31d	365d	Dependent item	Enabled	
mic astats - raw: RMS peak dB		mic.astats["RMS peak dB"]		31d	365d	Dependent item	Enabled	
mic astats - raw: RMS trough dB		mic.astats["RMS trough dB"]		31d	365d	Dependent item	Enabled	
mic astats - raw: Zero crossings		mic.astats["Zero crossings"]		31d	365d	Dependent item	Enabled	
Zero dB		zero.db	1m	31d	365d	Calculated	Enabled	

Displaying 15 of 15 foun

Zabbix Server



Zabbix Server

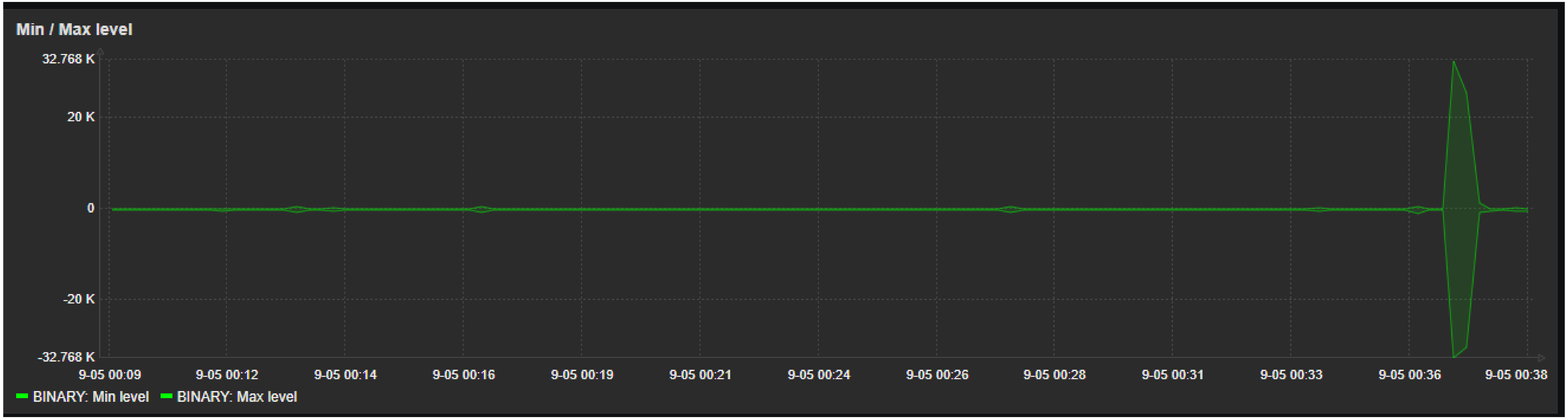


Sound Quality

- You don’ t need a PERFECT environment
- You don’ t need a PERFECT microphone
- Just somewhat predictable and consistent sound

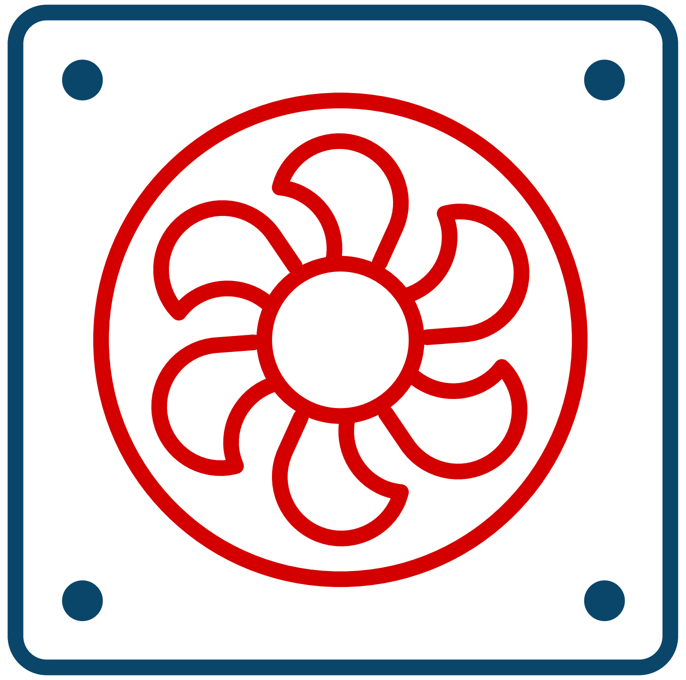
The Opposite Use Case

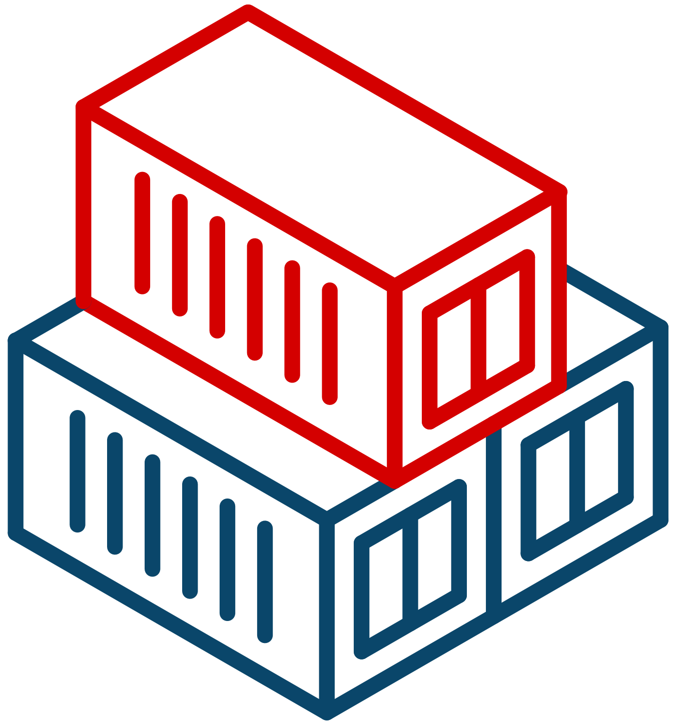
There should be silence – but you see spikes



Min / Max level
32.768 K
20 K
0
-20 K
-32.768 K
9-05 00:09
9-05 00:12
9-05 00:14
9-05 00:16
9-05 00:19
9-05 00:21
9-05 00:24
9-05 00:26
9-05 00:28
9-05 00:31
9-05 00:33
9-05 00:36
9-05 00:38
BINARY: Min level
BINARY: Max level

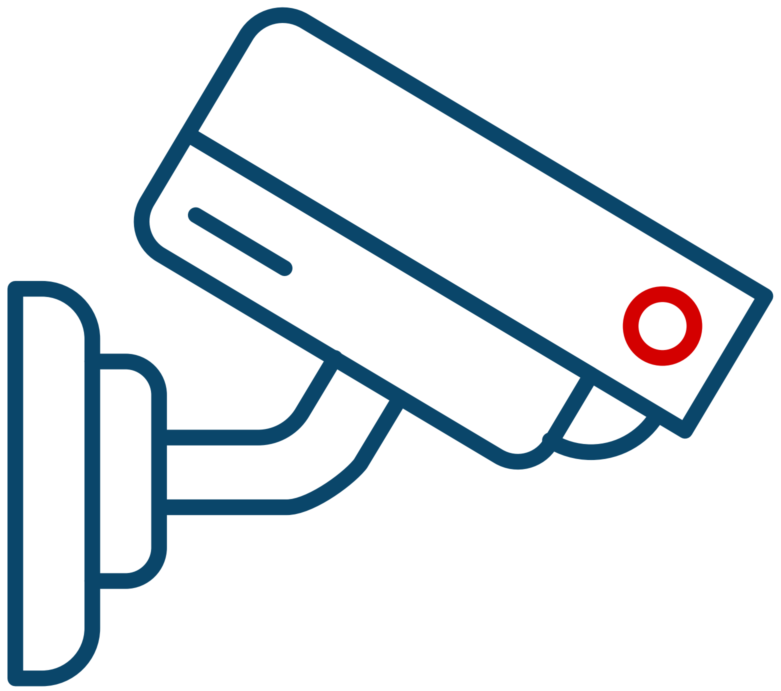
Real World





Factories or warehouses that still use devices without IoT capabilities

Real World



Physical security in areas where visual surveillance is limited or not possible

Real World

Healthcare - detecting falls or unusual sounds in non-invasive way https://github.com/b1nary1/zabbix

Thanks!