

Z Desktop Performance, Thermal, and Acoustic Improvements



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PROBLEM STATEMENT:

- Smaller chassis expectations and increasing power requirements are challenging our designs to provide maximum performance at a good customer acoustic experience
- Discover acoustic and thermal improvements to the Z2 Mini
- Increasing CPU thermal solution capacity may deliver a significant performance advantage on heavy multi-threaded workloads



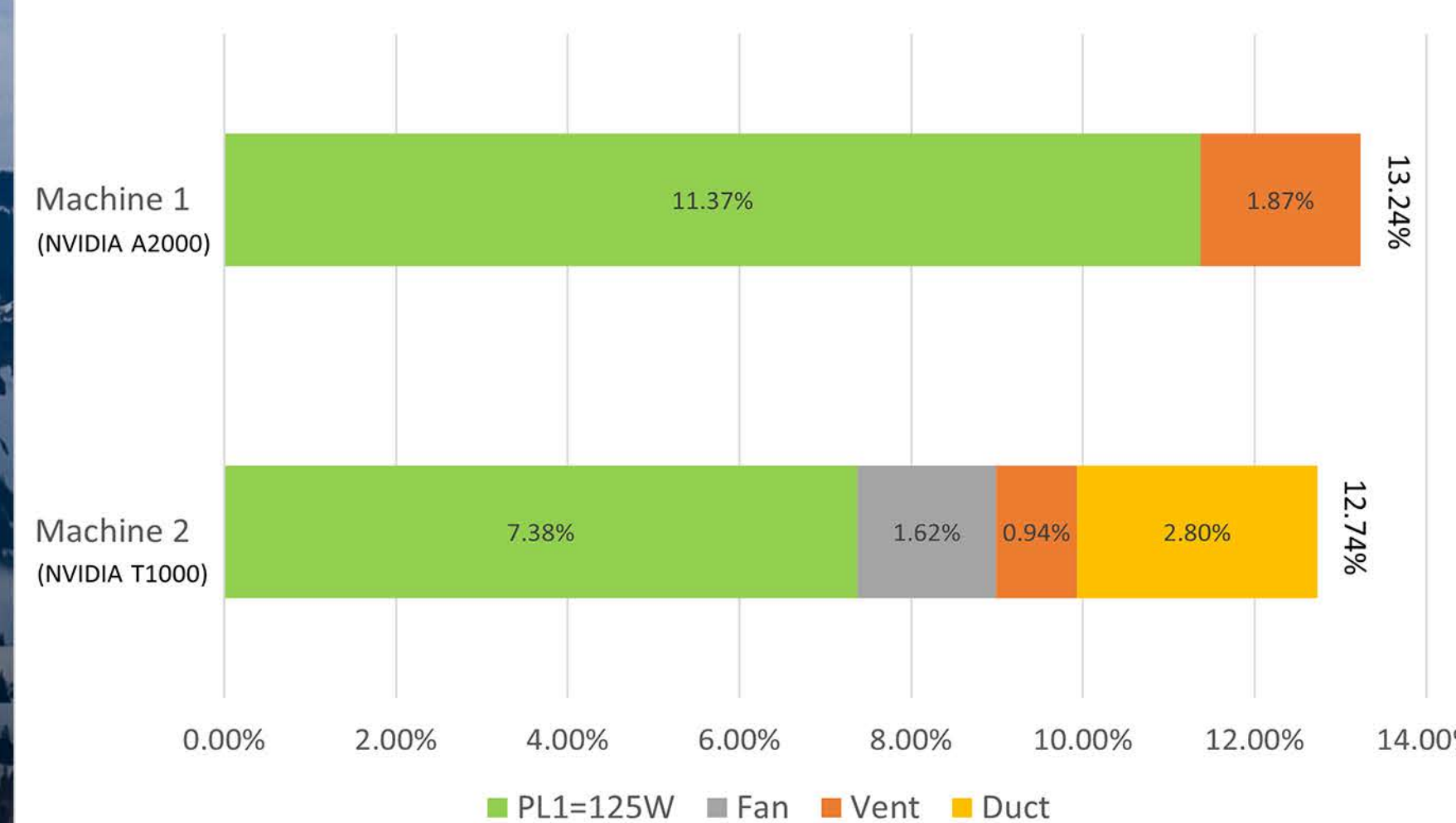
OUTCOME / DELIVERABLE:

- Increased CPU thermal solution headroom, which led to performance boost
- CPU performance increased up to 13.3%
- GPU performance increased up to 10.5%
- Decreased acoustic baseline during sustained multi-core benchmarks by ~4 dB
- Decreased number of acoustic spikes by more than 60%

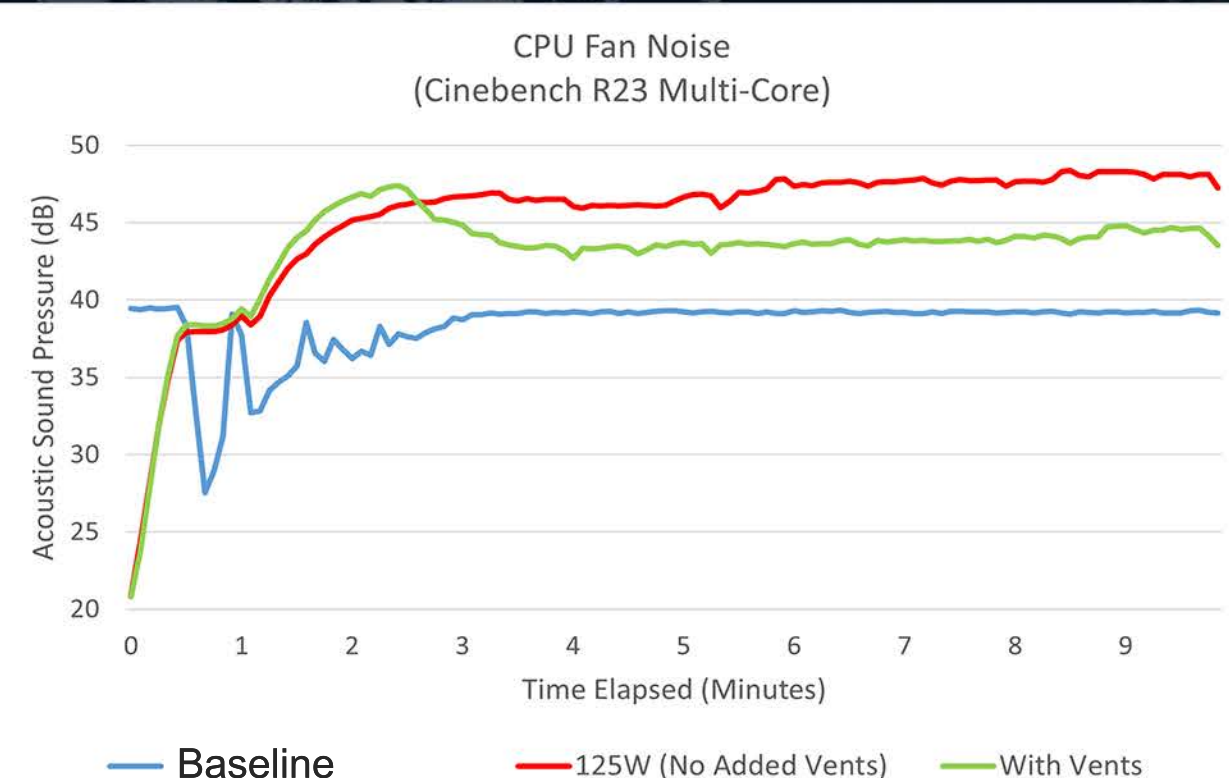
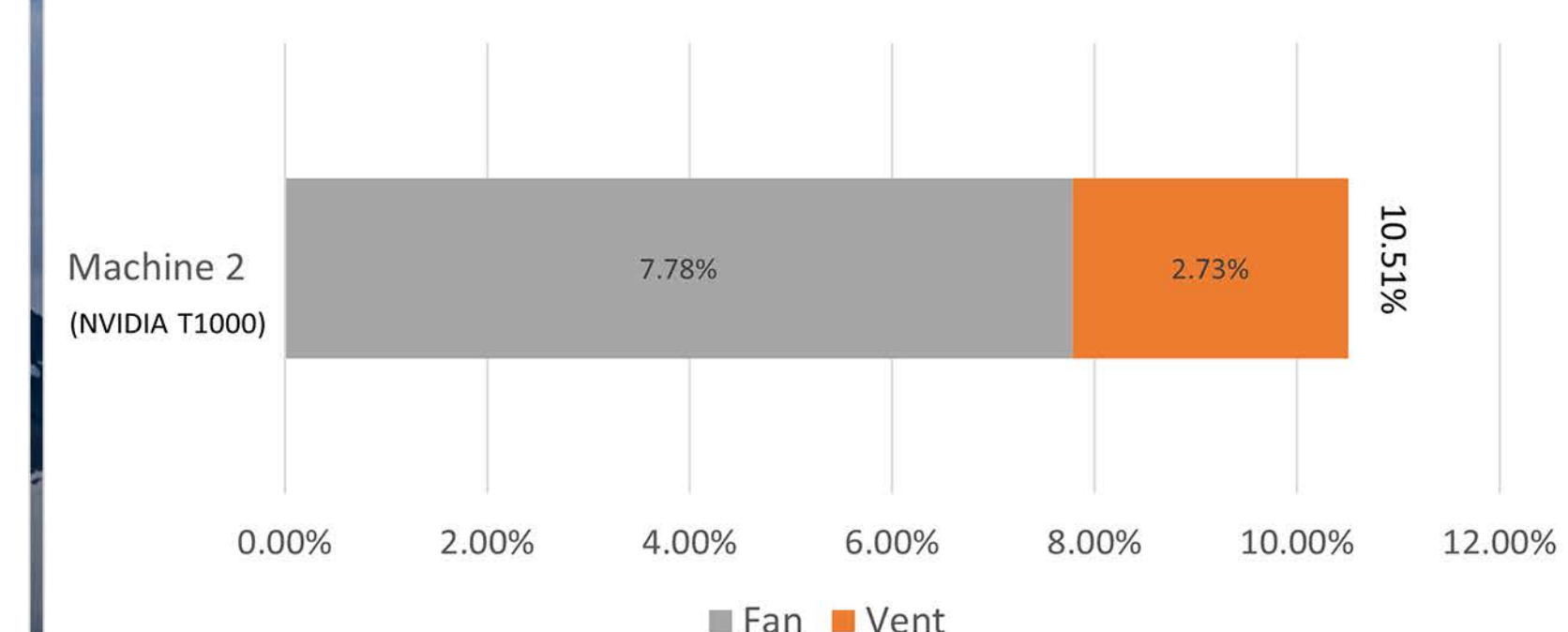
OBJECTIVE:

- Find design improvements for future platform generations
- Decrease magnitude and variation of acoustic noise
- Identify concepts to increase CPU and GPU performance
- Make suggestions for future Mini designs to be more thermally and acoustically efficient
- Draw broader conclusions on how to boost customer experience by compounding minor modifications

CPU Performance Improvements
(Cinebench R23 Multi-Core)



GPU Performance Improvements
(Time Spy Extreme)



LASTING IMPACT:

- Think creatively about ways to reduce acoustic noise and increase performance
- Provide design improvements for future platforms, especially smaller form factors
- Improvements will increase customer satisfaction, retention, and will also drive sales

Acoustic Testing Setup

Added Graphics Fan

Added Chassis Vents

Added CPU/GPU Separation Ducting

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