

Detailed Analysis Report

1. Introduction

The operating system under analysis runs on an x86_64 architecture with an 11th Gen Intel Core i7 CPU, DDR4 memory, SSD storage, and Intel GPU. Energy consumption estimates, carbon footprint calculations, and environmental scoring will be provided based on available data and reasonable assumptions where necessary.

2. Methodology

Data regarding CPU, GPU, RAM, storage devices, motherboard, system power usage, power management, and energy consumption were extracted and analyzed. Assumptions were made based on industry standards for power consumption of components and energy efficiency metrics.

Data Extraction:

- CPU power consumption: 11th Gen Intel Core i7-1165G7 @ 2.8GHz
- Memory usage: Total Memory - 15,534 MB, Used Memory - 5,438 MB
- Disk I/O: Utilizing SSD - nvme0n1
- GPU: Integrated Intel GPU with average power consumption of 0.255W
- Power Management: Battery information - L19M3PD6, 46% capacity

3. Analysis Findings

Energy Consumption Estimation

1. **CPU:** Assuming an average power consumption of the 11th Gen Intel Core i7 CPU at 30W under load, total energy consumption would be 240Wh per hour.
2. **Memory:** DDR4 RAM with a total memory of 15,534 MB and 5,438 MB used indicates power

consumption of approximately 5W.

3. ****Storage:**** Utilizing an SSD (nvme0n1) results in estimated energy consumption of 0.05W during read and 0.15W during write operations.
4. ****GPU:**** The Intel GPU with an average power consumption of 0.255W estimates a total energy consumption of 2.04Wh per hour.

Carbon Footprint Calculation

1. ****CPU:**** Assuming a carbon intensity of electricity at 0.5 kg CO₂/kWh, the CPU contributes 120kg of CO₂ emissions per hour.
2. ****Memory:**** With a power consumption of 5W, the memory's carbon footprint is approximately 4kg of CO₂ emissions per hour.
3. ****Storage:**** The SSD's energy consumption translates to 0.0012kg of CO₂ emissions per hour during read and 0.0036kg during write operations.
4. ****GPU:**** The Intel GPU contributes 0.01kg of CO₂ emissions per hour.

Environmental Score Assessment

- E-waste and resource depletion considerations were not explicitly provided in the data. However, the use of SSD over HDD can be assumed to reduce e-waste due to SSD's longer lifespan and durability.

4. Recommendations

1. Optimize CPU utilization to reduce energy consumption and associated carbon emissions.
2. Implement power-saving modes for memory and storage devices to lower energy usage.
3. Utilize energy-efficient GPUs or consider integrated graphics solutions for reduced power consumption.
4. Ensure proper disposal and recycling of electronic components to mitigate e-waste impact.

5. Regularly monitor battery health and implement strategies to extend battery lifespan for sustainable energy usage.

5. Conclusion

The detailed analysis highlights the significant energy consumption of the CPU, memory, storage, and GPU components. By applying the recommendations for improved energy efficiency, the system can reduce its carbon footprint and environmental impact while enhancing sustainability.