# CWE Detail – CWE-1338

## Description

A hardware device is missing or has inadequate protection features to prevent overheating.

## Extended Description

Hardware, electrical circuits, and semiconductor silicon have thermal side effects, such that some of the energy consumed by the device gets dissipated as heat and increases the temperature of the device. For example, in semiconductors, higher-operating frequency of silicon results in higher power dissipation and heat. The leakage current in CMOS circuits increases with temperature, and this creates positive feedback that can result in thermal runaway and damage the device permanently. Any device lacking protections such as thermal sensors, adequate platform cooling, or thermal insulation is susceptible to attacks by malicious software that might deliberately operate the device in modes that result in overheating. This can be used as an effective denial of service (DoS) or permanent denial of service (PDoS) attack. Depending on the type of hardware device and its expected usage, such thermal overheating can also cause safety hazards and reliability issues. Note that battery failures can also cause device overheating but the mitigations and examples included in this submission cannot reliably protect against a battery failure. There can be similar weaknesses with lack of protection from attacks based on overvoltage or overcurrent conditions. However, thermal heat is generated by hardware operation and the device should implement protection from overheating.

## Threat-Mapped Scoring

Score: 1.5

Priority: P4 - Informational (Low)

## Related Attack Patterns (CAPEC)

* CAPEC-624
* CAPEC-625

## Modes of Introduction

**•** Architecture and Design: N/A

**•** Implementation: Such issues could be introduced during hardware architecture, design or implementation.

## Common Consequences

**•** Impact: DoS: Resource Consumption (Other) — Notes:

## Potential Mitigations

**•** Architecture and Design: Temperature maximum and minimum limits should be enforced using thermal sensors both in silicon and at the platform level. (Effectiveness: N/A)

**•** Implementation: The platform should support cooling solutions such as fans that can be modulated based on device-operation needs to maintain a stable temperature. (Effectiveness: N/A)

## Applicable Platforms

**•** None (Class: Not Language-Specific, Prevalence: Undetermined)

## Demonstrative Examples

**•** Execution core and platform do not support thermal sensors, performance throttling, or platform-cooling countermeasures to ensure that any software executing on the system cannot cause overheating past the maximum allowable temperature.