Hardware CWE™ Special Interest Group (SIG)

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MITRE

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Agenda

REMINDER: This meeting is being recorded.

- **Housekeeping and Announcements**
- **Working Items for this meeting:**

1	CWE Nit Bits	Bob H	5 min
2	Discussion: Covert Channels and CWE	Bob H	10 min
3	Discussion: Most Important Hardware Weaknesses Refresh	Bob H	10 min
4	AOB (Any Other Business)		

Housekeeping

- **Schedule:**
  - **Next Meeting:**
    - **September 8th**
    - **12:30 – 1:30 PM EST (16:30 – 17:30 UTC)**
    - **Microsoft Teams**
- **Contact: cwe@mitre.org**
- **Mailing List:** *hw-cwe-special-interest-group-sig-list@mitre.org*
- **Minutes from previous meetings available on our GitHub site:**
  - **https://github.com/CWE-CAPEC/hw-cwe-sig**

Announcements

- **Tentative: CISA strategy around Secure By Design/Secure By Default for Sep SIG**

CWE Nit Bits

B*ite-sized knowledge*
that will enhance your CWE proficiency!

Vulnerability Mapping Notes

Provides guidance for when or whether to map an issue to a particular CWE entry or to suggest alternatives.

- **Usage:** describes whether the CWE should be used for mapping vulnerabilities to their underlying weaknesses as part of root cause analysis.
- **Reason:** uses a limited vocabulary to summarize the Usage.
  - Allowed, Allowed-with-Review, Discouraged, etc.
- **Rationale:** provides context for the Usage.
- **Comments:** provides further clarification to the reader.
- **Suggestions:** includes suggestions for additional CWEs that might be more appropriate for the mapping task.

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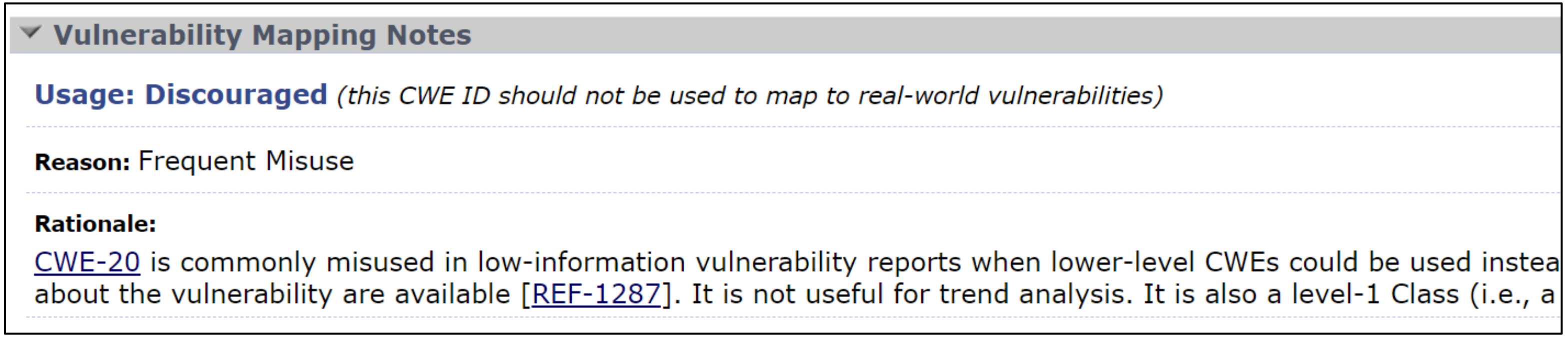
Examples

CWE-20: Improper Input Validation



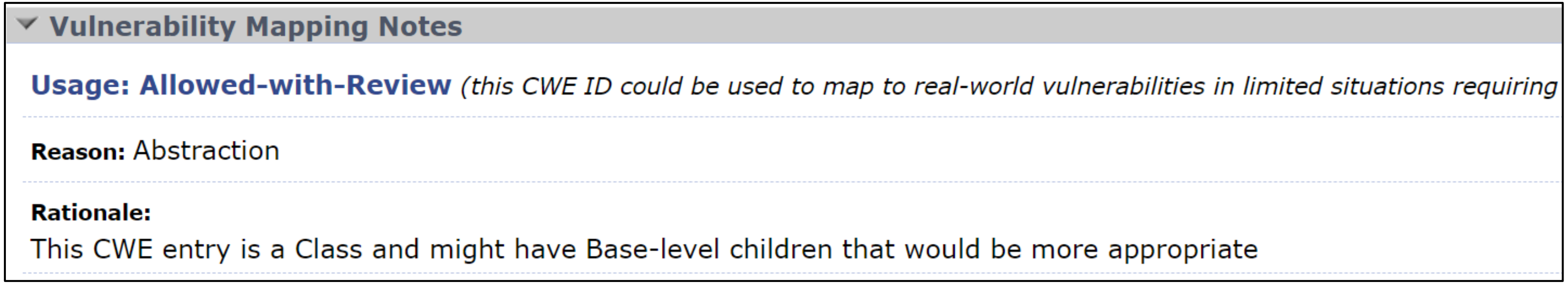
Vulnerability Mapping Notes

Usage: Discouraged *(this CWE ID should not be used to map to real-world vulnerabilities)*

Reason: Frequent Misuse

Rationale:
CWE-20 is commonly misused in low-information vulnerability reports when lower-level CWEs could be used instea
about the vulnerability are available [REF-1287]. It is not useful for trend analysis. It is also a level-1 Class (i.e., a

CWE-514: Covert Channel



Vulnerability Mapping Notes

Usage: Allowed-with-Review *(this CWE ID could be used to map to real-world vulnerabilities in limited situations requiring*

Reason: Abstraction

Rationale:
This CWE entry is a Class and might have Base-level children that would be more appropriate

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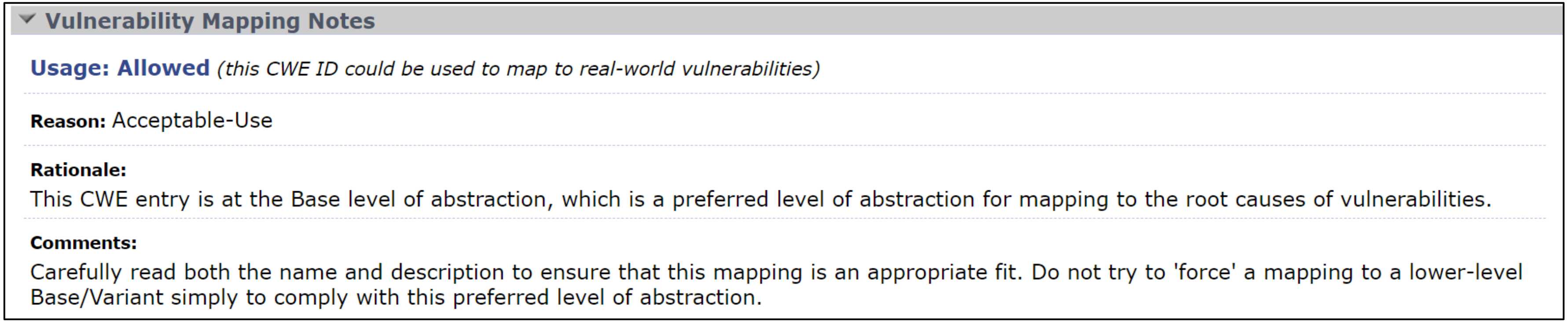
Example 2

CWE-1277: Firmware Not Updateable



Vulnerability Mapping Notes

Usage: Allowed *(this CWE ID could be used to map to real-world vulnerabilities)*

Reason: Acceptable-Use

Rationale:

This CWE entry is at the Base level of abstraction, which is a preferred level of abstraction for mapping to the root causes of vulnerabilities.

Comments:

Carefully read both the name and description to ensure that this mapping is an appropriate fit. Do not try to 'force' a mapping to a lower-level Base/Variant simply to comply with this preferred level of abstraction.

Covert Channel Coverage in CWE

COVID-Bit Research Item[1][2]

- **In 2022, researchers at Ben Gurion University in Israel developed a new data exfiltration method for air-gapped systems called COVID-bit.**
- **Malware generates electromagnetic radiation in the 0-60 kHz frequency band (assumes Malware got there somehow).**
- **EM emissions are generated by manipulating the workload of the CPU. Claims of indirect control SMPS.**
- **The electromagnetic radiation generated by this intentional process can be received from a distance using appropriate antennas.**

1. *https://thehackernews.com/2022/12/covid-bit-new-covert-channel-to.html?m=1*
2. *https://arxiv.org/abs/2212.03520*

Covert Channels and Side Channels

- Initial thought was that COVID-Bit could be a DEMOX for CWE-1300: Improper Protection of Physical Side Channels
- As HW SIG Members had correctly pointed out, COVID-Bit is about Covert Channels and NOT Side Channels
- Covert Channel (CC) / Side Channel (SC)
  - Intentional transmission (CC). Accidental transmission (SC) – *Ross Anderson* [1]
  - Adversary controls input and output (CC). Adversary can only read output (SC) – *Intel* [2]
  - Not an intended resource but exists due the application's behaviors. –*CWE-514 Notes* [3]
- If not CWE-1300 (SC), where would something like this map to in HW view?
- Closest we have is CWE-514: Covert Channels

1. *https://www.cl.cam.ac.uk/~rja14/Papers/SEv3-ch19-7sep.pdf*
2. *https://www.intel.com/content/www/us/en/developer/articles/technical/software-security-guidance/best-practices/refined-speculative-execution-terminology.html*
3. *https://cwe.mitre.org/data/definitions/514.html*

CWE-514: Covert Channel

https://cwe.mitre.org/data/definitions/514.html

Abstraction: Class

Description: A covert channel is a path that can be used to transfer information in a way not intended by the system's designers.

Extended Description: Typically the system has not given authorization for the transmission and has no knowledge of its occurrence.

Relationships:

ChildOf	CWE-1229:Creation of Emergent Resource
ParentOf	CWE-385:Covert Timing Channel
ParentOf	CWE-515: Covert Storage Channel
CanFollow	CWE-205: Observable Behavioral Discrepancy

Vulnerability Mapping Notes:

Usage: Allowed-with-Review; **Reason:** Abstraction

Rationale: This CWE entry is a Class and might have Base-level children that would be more appropriate; **Comments:** Examine children of this entry to see if there is a better fit.

NOTE: Nothing about EM based Covert Channels, nor HW cause, e.g., SMPS

Discussion

Questions:

- Should we place CWE-514 in the HW View?
- Do we need to modify CWE-514 to be less software centric?
- Or create a base of CWE-514 and put that into the HW view?

Previous HW SIG Member Comments:

- Covert Channels should have coverage in the hardware view *–Jason Oberg*
- Covert Channels should be in the HW categories Security Flow Issues, General Circuit and Logic Design Concerns, or Debug and Test Problems. *–Paul Wortman*

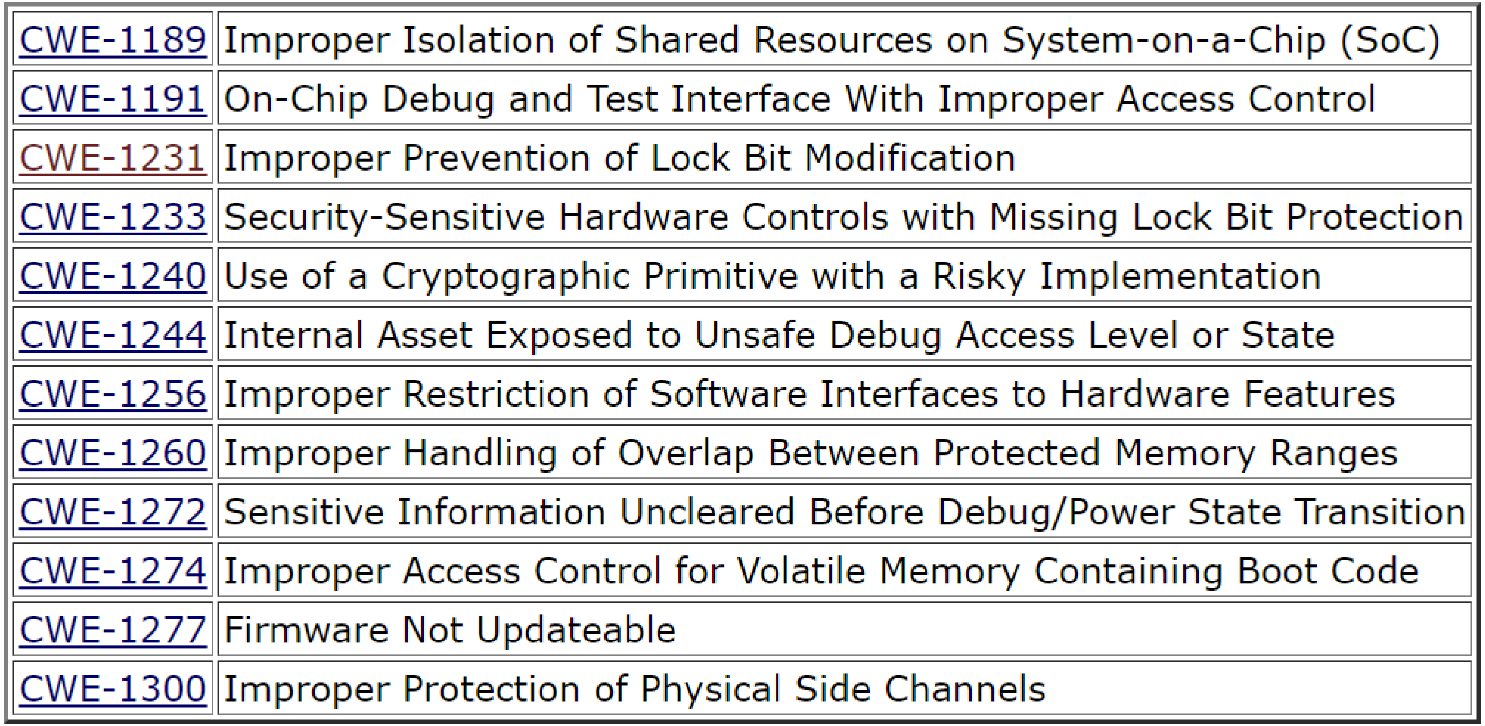
Most Important Hardware Weaknesses Refresh

Bob H

Most Important Hardware Weaknesses (MIHW)

- **Is this something worth revisiting?**
- **Part of CWE 4.6 Release, October 28, 2021**
- **Have there been substantial developments since the last release of MIHW?**
- **Would those affect the rankings and inclusions of the list in any meaningful way?**

Current MIHW



CWE-1189	Improper Isolation of Shared Resources on System-on-a-Chip (SoC)
CWE-1191	On-Chip Debug and Test Interface With Improper Access Control
CWE-1231	Improper Prevention of Lock Bit Modification
CWE-1233	Security-Sensitive Hardware Controls with Missing Lock Bit Protection
CWE-1240	Use of a Cryptographic Primitive with a Risky Implementation
CWE-1244	Internal Asset Exposed to Unsafe Debug Access Level or State
CWE-1256	Improper Restriction of Software Interfaces to Hardware Features
CWE-1260	Improper Handling of Overlap Between Protected Memory Ranges
CWE-1272	Sensitive Information Uncleared Before Debug/Power State Transition
CWE-1274	Improper Access Control for Volatile Memory Containing Boot Code
CWE-1277	Firmware Not Updateable
CWE-1300	Improper Protection of Physical Side Channels

New HW CWEs Since MIHW

- **CWE-1342: Information Exposure through Microarchitectural State after Transient Execution**
- **CWE-1357: Reliance on Insufficiently Trustworthy Component**
- **CWE-1384: Improper Handling of Physical or Environmental Conditions**
- **CWE-1388: Physical Access Issues and Concerns**

Discussion

- **Have there been substantial developments since the last release of MIHW?**
- **Would those affect the rankings and inclusions of the list in any meaningful way?**
- **Are there observational trends that would change the current list in any significant and meaningful way?**

Next Meeting (Sep 8th)

CWE@MITRE.ORG

- **Mailing List:** *hw-cwe-special-interest-group-sig-list@mitre.org*
  - ***NOTE: All mailing list items are archived publicly at:***
    - *https://www.mail-archive.com/hw-cwe-special-interest-group-sig-list@mitre.org/*
- **What would members of this body like to see for the next HW SIG agenda?**
- **Questions, Requests to present? Please let us know.**

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Backup