

2025-11-07

## # SPDX Hardware Team Meeting 2025-11-07

PR: <https://github.com/spdx/meetings/pull/993>

### ## Attendees

[x] Alfred Strauch  
[x] Steven Carbno  
[ ] Bob Martin (MITRE)  
[ ] Dishoung White II  
[ ] Kate Sewart  
[ ] Victor Lu  
[X] Jim Vitrano  
[ ] Amit Kumar  
[ ] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[ ] Allan Friedman  
[X] Greg Shue  
[ ] Riley Barello-Myers  
[ ] Henk Berkholz  
[ ] Dan Hopkins  
[ ] Courtney Ng  
[X] Andrew Viater

### ## Agenda

- \* [Both] PR Update /Core/Specification (PR #1142) text improvement for specification
- \* Group Meeting considerations - Combined Hardware, SC, and Regulatory Compliance
  - \* Regulatory compliance is a core concept for SPDX operations. Do we create a new group, or do we change the name to the HW and SC group to include regulatory compliance?
  - \* Goal of Regulatory Compliance group:
    - \* Show how SPDX meets the regulatory compliance requirements through the development of examples, processes, and solutions.
  - \* Define the steps or process to achieve the group's goal (several steps have been completed already)
    - \* create a document framework of the key CRA needs map the needs against the CRA

### ## Links and background

- \* CRA Mapping Example Outline:

Review the proposed goals and objectives of CRA Mapping Example (link below)

<https://docs.google.com/document/d/1didhLnnap9aucov87B51Hv7dwNKR8PwLolilJDq6gCE/edit?usp=sharing>

- \* Discuss CRA mapping ideas and the document developed by Greg

[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV\\_P26BV9oo/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV_P26BV9oo/edit?tab=t.0)

- \* Git Repository PR written to deal with the CRA map

<https://github.com/gregshue/spdx-examples/tree/conformanceexamples/conformance/example1/content/src>

- \* Engineering requirements vs SPDX - add questions to main document

[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV\\_P26BV9oo/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV_P26BV9oo/edit?tab=t.0)

### ## Notes

- \* Provided an overview of SPDX hardware and supply chain to Andrew Viater

- \* Specification must is.....

  - \* Definition of other in vocabulary - catch all for users wanting to define guide, remove

- \* Problem- compliance confusion with HW and SC

  - \* SPDX Regulatory Compliance

  - \* Are there 2 groups?

  - \* Separation of the mailing list is an issue - do we require 2 mailing lists?

  - \* Kate Stewart has been working in relation to CRA compliance

  - \* Licensing has always been in compliance

  - \* mapping SPDX data elements as part of a group (gap analysis)

  - \* similar to an AI profile

  - \* Keep HW and SC as it exist, but focus on compliance

  - \* Accumulate CRA information as part of group tasks

  - \* Focus on manufacturers

  - \* Presentation by Kate related to Zephyr

    - \* [https://www.enisa.europa.eu/sites/default/files/2024-11/Cyber%20Resilience%20Act%20Requirements%20Standards%20Mapping%20-%20final\\_with\\_identifiers\\_0.pdf](https://www.enisa.europa.eu/sites/default/files/2024-11/Cyber%20Resilience%20Act%20Requirements%20Standards%20Mapping%20-%20final_with_identifiers_0.pdf)

    - \* Manufacturers becoming aware of the CRA and vulnerabilities (OSS)  
<https://osseu2025.sched.com/event/25VnL/zephyr-evolving-to-cra-readiness-kate-stewart-the-linux-foundation> (scroll to bottom for .pdf) of the presentation I gave on Zephyr a couple of months ago.

### ## Action Items

- \* Notify leadership related to the change

- \* Send email to SPDX community for notification

- \* revise other under specification

- \* Meet with Kate to organize group discussion and actions

### ## Decision Items

- \* HW and SC Group will focus on Compliance - details TBD

2025-10-31

## # SPDX Hardware Team Meeting 2025-10-31

PR: <https://github.com/spdx/meetings/pull/993>

### ## Attendees

[x] Alfred Strauch  
[x] Steven Carbno  
[X] Bob Martin (MITRE)  
[ ] Dishoung White II  
[ ] Kate Sewart  
[X] Victor Lu  
[X] Jim Vitrano  
[ ] Amit Kumar  
[ ] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[ ] Allan Friedman  
[X] Greg Shue  
[ ] Riley Barello-Myers  
[ ] Henk Berkholz  
[ ] Dan Hopkins  
[X] Courtney Ng

### ## Agenda

- \* Note: DT Time change happens next week
- \* PR Update Updated model.Drawio #1139
- \* relationshipDataPointer (part of CRA discussion)
  - \* hasData or hasAnswer can be used to point to a specific graph item such as
  - \* hasPurpose
  - \* asset validation
  - \* extend annotation class (Kate) subject, you would need 2 subject in annotation
- \* CRA Mapping Example Outline:  
Review the proposed goals and objectives of CRA Mapping Example (link below)  
<https://docs.google.com/document/d/1didhLnnap9aucov87B51Hv7dwNKR8PwLolilJDq6gCE/edit?usp=sharing>
- \* Discuss CRA mapping ideas and the document developed by Greg  
[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV\\_P26BV9oo/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV_P26BV9oo/edit?tab=t.0)
- \* Wants and needs related to requirements - FUSA discussion
  - \* Wants are separate from requirements
- \* Arthit Suriyawongkul summary of all 3.1 relationships - Review latest thoughts

<https://docs.google.com/spreadsheets/d/1g9TophkZ2tWhTPMGGHqGOUurzZvOdkBtBJCvyBsa8kc/edit?gid=1850842743#gid=1850842743>

## ## Notes

- \* Hardware discussion
  - \* DrawIO updated (core, hardware, SC) - please review
- \* Relationshipdatapointer
  - \* the answer to a specific question is in an external document using relationship
  - \* "hasrelationship" relationship - doc, element
  - \* machine readable strategy
  - \* used in relationship to functional design - evaluation is linked
  - \* custom class can be used to point to other graphs (standards) using Jason--LD. Pull this element
  - \* other data types may need to be considered - child source - sources are controlled by other agents - holds together existing components

## CRA Strategy

- \* create a document framework of the key CRA needs
  - \* map the needs against the CRA
  - \* SPDX tools will support internal SRPDX and external data
  - \* Digital elements need to be considered as the primary data requirements
  - \* Zephyr or Linux implementation are good
    - \* used to grow product lines
    - \* ie USB charging block expands to product line
  - \* How do we support a product line architecture?
    - \* here is the software or hardware branch - becomes a template for any product
  - \* Git Repository PR written to deal with the CRA map
- <https://github.com/gregshue/spdx-examples/tree/conformanceexamples/conformance/example1/content/src>
- \* Uses Staneslov's tool to for ease of creation
  - \* System Engineering methodology - commodity consumer electronics - SeBok
  - \* Electronic target for sale in EU as example - context
  - \* SPA, FCC, UL or SPC regulatory examples -- conformance to other standards using CEBok engineering standard
    - \* Automotive and others have additional constraints
    - \* a common pattern will exist
  - \* SDot,, StrictDot used to generate folder - like include statement
    - \* Allows you to drill down
    - \* mermaiduml - [mermaid.js.org](http://mermaid.js.org)
  - \* interface standards and specifications
  - \* agent representations are broken down for specificity
  - \* wants and need mapping to SPDX
  - \* breakdown of system

- \* logical view outlines how information matches SPDX
- \* environmental constraints need to be considered
- \* Will branch be part of conformance examples
- \* example would then be merged into conformance examples - Kate or Gary needed

## ## Action Items

- \* Everyone need to review
- \* Contact Kate related to branches - Greg
- \* Engineering requirements vs SPDX - add questions to main document  
[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCl0G52NTJhsV\\_P26BV9oo/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCl0G52NTJhsV_P26BV9oo/edit?tab=t.0)
- \* Create a summary to be sent out to the SPDX community as part of an invitation to attend

## ## Decision Items

- \* Conformance example would be needed in SPDX
- \* Contact Rob Craig to setup email list

2025-10-24

## # SPDX Hardware Team Meeting 2025-10-24

PR: <https://github.com/spdx/meetings/pull/990>

### ## Attendees

[x] Alfred Strauch  
[x] Steven Carbno  
[] Bob Martin (MITRE)  
[] Dishoung White II  
[X] Kate Sewart  
[] Victor Lu  
[X] Jim Vitrano  
[] Amit Kumar  
[] Issac Asay  
[] Lucas Tate  
[] Apoorav Trehan  
[] Alex Volykin  
[X] Allan Friedman  
[X] Greg Shue  
[] Riley Barelllo-Myers coz o evenviidfc65c06xf  
[] Henk Berkholz  
[] Dan Hopkins

### ## Agenda

\* PR Update -- Full merge awaiting final approval - \*\* merged\*\*

`islocatedAt` --> `locatedAt` in RelationshipType #1136-- Follows the pattern of invokedBy, modifiedBy, packagedBy, patchedBy, reportedBy, ..., omitting "is" prefix for brevity.

\* License conformance related to SC

<https://github.com/spdx/spdx-3-model/pull/1122>

\* Arthit Suriyawongkul summary of all 3.1 relationships - Review latest thoughts

<https://docs.google.com/spreadsheets/d/1g9TophkZ2tWhTPMGGHqGOUurzZvOdkBtBJCvyBsa8kc/edit?gid=1850842743#gid=1850842743>

\* hasdistribution artifact - may need to be deprecated in the future (recommend it be declared obsolete in 3.2)

\* Is software supported in the supply chain in 3.1?

\* Requirementslinkage ?

\* Discuss CRA mapping ideas and the document developed by Greg

[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV\\_P26BV9oo/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV_P26BV9oo/edit?tab=t.0)

\* Submission of HW and SC for merge into dev main branch

\* Misuse of product - What is misuse? HW, SW, and SC discussion

### ## Notes

<https://spdx.github.io/spdx-spec/v3.1-dev/model/Hardware/Hardware/>

<https://spdx.github.io/spdx-spec/v3.1-dev/model/SupplyChain/SupplyChain/>

- \* Discussed the idea of creating a group to create an example of how SPDX can be used to satisfy regulations such as CRA.
  - \* Suggested it be under examples
  - \* To be called compliance
- \* Kate Stewart will help organize the group Rob Kreg
  - \* Demonstrate how SPDX data can be used to have regulatory conformance
  - \* Building out information with CRA as proof of concept
- \* License issues related to elements - suggested implementation is in conflict with HW
  - \* Policy engines use licenses, therefore need base information
  - \* 1 concluding license per agent per item may be useful
- \* Can we use SC related to software build?
  - \* Runtime issues need to be discussed
- \* hasdistribution artifact - may need to be deprecated in the future (recommend it be declared obsolete in 3.2)
- \* relationshipDataPointer
  - \* hasData or hasAnswer can be used to point to a specific graph item such as
  - \* hasPurpose
  - \* asset validation
  - \* extend annotation class (Kate) subject, you would need 2 subject in annotation
  - \* needs to meet complex relationship needs
  - \* tool developers need to be able to implement solutions using the relationshipDataPointer or revised annotation
  - \* Functional Design issues need to be considered as part of the issue
- \* conversation related to requirements, regulations and policy - commonalities and differences
  - \* specification is a collection of requirements
  - \* need ontology to support these issues
- \* discussion of needs vs requirements
  - \* needs are none testable requirement
  - \* capability can be written as a requirement

### ## Action Items

- \* Need to send out an email to SPDX members related to participation
- \* Build an example related to license and elements
- \* DrawIO for 3.1 is erroring \*\*fixed\*\*

### ## Decision Items

- \* Compliance example group to be formed
- \* Contact Rob Kreg to setup email list
- \* Start as a pull request Headed by Greg

2025-10-17

## # SPDX Hardware Team Meeting 2025-10-17

PR: <https://github.com/spdx/meetings/pull/991>

### ## Attendees

[x] Alfred Strauch  
[x] Steven Carbno  
[X] Bob Martin (MITRE)  
[ ] Dishoung White II  
[X] Kate Stuart  
[X] Victor Lu  
[X] Jim Vitrano  
[ ] Amit Kumar  
[ ] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[X] Allan Friedman  
[X] Greg Shue  
[ ] Riley Barelllo-Myers  
[ ] Henk Berkholz  
[ ] Dan Hopkins

### ## Agenda

- \* Relationship “followed” discussion related to supply chain
  - \* defined process-related
  - \* Arthit Suriyawongkul summary of all 3.1 relationships  
<https://docs.google.com/spreadsheets/d/1g9TophkZ2tWhTPMGGHqGOUurzZvOdkBtBJCvyBsa8kc/edit?gid=1850842743#gid=1850842743>
- \* Is software supported in the supply chain in 3.1?
- \* Requirements linkage
- \* Discuss CRA mapping ideas and the document developed by Greg  
[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV\\_P26BV9oo/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV_P26BV9oo/edit?tab=t.0)
- \* Submission of HW and SC for merge into dev main branch
- \* Misuse of product - What is misuse? HW, SW, and SC discussion

### ## Notes

- \* Discussed the nature of risk management as applied to SC and BOMs.
  - \* Points made related to the intent of SPDX and the ability of SPDX
  - \* A discussion of risk as related to Capture, Read, Analyse, and Solve was introduced as a basis for overall data management. Applies to microprocessor supply chains
    - \* There are a lot of competing interests between parties and levels of operation
      - \* regulators, suppliers, distributors, and service providers
      - \* Confidentiality is used as a data-sharing issue

- \* An agreement was reached related to the ability of SPDX to meet the needs of entities based on need and implementation
- \* CRA needs are a major consideration related to data capture and sharing
- \* Discussed the “followed”. Review the definition and use as a procedural implementation related to supply chains and engineering processes
- \* Arthit Suriyawongkul summary of all 3.1 relationships
  - \* Licensing -- optional; patents require a license.
  - \* Contact point - any artifact related to an agent. It is a relationship between elements. Start and end time - vulnerability management
  - \* Need to define as artifacts - “conformsTo”
  - \* haspersistantmemory - may apply to HW
  - \* hasdistribution artifact that has a different implementation because of SC
  - \* validatedOn - may be used by HW

### **## Action Items**

- \* hasdistribution artifact - may need to be deprecated in the future

### **## Decision Items**

2025-10-10

## # SPDX Hardware Team Meeting 2025-10-10

PR: <https://github.com/spdx/meetings/pull/964>

### ## Attendees

[x] Alfred Strauch  
[x] Steven Carbno  
[X] Bob Martin (MITRE)  
[ ] Dishoung White II  
[ ] Kate Stuart  
[ ] Victor Lu  
[X] Jim Vitrano  
[ ] Amit Kumar  
[ ] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[X] Alex Volykin  
[X] Allan Friedman  
[X] Greg Shue  
[ ] Riley Barelllo-Myers  
[ ] Henk Berkholz  
[X] Dan Hopkins

### ## Agenda

\* PR for product specification - expansion of definition - changed conforms to a specification class <https://github.com/spdx/spdx-3-model/pull/1109>

\* Update with hardware class from artifact not Element?

\* Automated Data Fields Pointers for sharing discussion review and refinement

\* Requirementslinkage

\* Discuss CRA mapping ideas and the document developed by Greg

[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV\\_P26BV9oo/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCI0G52NTJhsV_P26BV9oo/edit?tab=t.0)

\* Submission of HW and SC for merge into dev main branch

\* Arthit Suriyawongkul summary of all 3.1 relationships

<https://docs.google.com/spreadsheets/d/1g9TophkZ2tWhTPMGGHqGOUurzZvOdkBtBJCvyBsa8kc/edit?gid=1850842743#gid=1850842743>

### ## Note

\* Higher level conversation related to regulations, policy and business needs.

\* Separation exists between needs and regulator desires and business needs or implementations

\* Help industry

\* Help regulatory players

- \* Decision makers do not understand process or need
- \* transparency issues - have key issue of privacy -Dan
  - \* Acme component is usee by multipl org but others make a similar party Anatomize information - where was that party made
- \* Idea of misuse of product (CRA) discussion - micro controller/baby monitors

## **## Action Items**

- Misuse of product - What is misuse? HW, SW, and SC discussion

## **## Decision Items**

- \* hardware class from artifact

2025-10-03

# # SPDX Hardware Team Meeting

2025-10-03

PR: <https://github.com/spdx/meetings/pull/965>

## ## Attendees

[x] Alfred Strauch  
[x] Steven Carbo  
[x] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[x ] Kate Stuart  
[ ] Victor Lu  
[ ] Jim Vitrano  
[x] Amit Kumar  
[ ] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[x] Allan Friedman  
[ ] Greg Shue  
[ ] Riley Barelllo-Myers  
[ ] Henk Berkholz

## ## Agenda

- \* PR for product specification - expansion of definition  
<https://github.com/spdx/spdx-3-model/pull/1109>
- \* Discuss CRA mapping ideas and the document developed by Greg  
[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCi0G52NTJhsV\\_P26BV9o/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCi0G52NTJhsV_P26BV9o/edit?tab=t.0)
- \* Submission of HW and SC for merge into dev main branch

## ## Note

- \* **Allan Friedman** initiative presented new initiative related to defining the use of HBOMs in business.
  - \* Gov acting as if HBOMs exist
  - \* Compliance and end customers need more information
  - \* Manufacturing BOMs do not link well to a SKU
  - \* High security organizations are targeting
  - \* Counterfieting is an issue
  - \* Business prcesses and expectations
  - \* forecasting needs is part of issues - implementation and
  - \* Explicit issues - levels of assurance varies
  - \* placeholder initiative is HBOM.tech

Amit

- \* Traceability with visibility for larger parts of supply chain
- \*

Bob

- \* NIST visibility framework
- \* UNDP, DPP, CSA

Steven

- \* PR Review
- \* Intended use field as in data profile, desire to move to core to more effectively reuse.
- \* Will need to review with PR with Alex

Automated Data Fields Pointers for sharing

- \* Requirementslinkage
  - \* Where do you find data elements, and in what field or element does the data belong or map? Forward and backward looking
  - \* This needs to be an automated process.

### ## Action Items

- \* Need examples for the use of Requirementslinkage

### ## Decision Items

\*

2025-09-26

# # SPDX Hardware Team Meeting

2025-09-26

PR: <https://github.com/spdx/meetings/pull/966>

## ## Attendees

[x] Alfred Strauch  
[x] Steven Carbno  
[X] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[ ] Kate Stuart  
[ ] Victor Lu  
[ ] Jim Vitrano  
[ ] Amit Kumar  
[X] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[X] Alex Volykin  
[ ] Allan Friedman  
[X] Greg Shue  
[ ] Riley Barelllo-Myers  
[ ] Henk Berkholz

## ## Agenda

- \* PR update - status of hardware to dev branch
- \* Product specification - improving class with SKU (presently part no.)
- \* Greg has created a document related to CRA and SPDX -- Greg will discuss ideas  
[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCl0G52NTJhsV\\_P26BV9oo/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCl0G52NTJhsV_P26BV9oo/edit?tab=t.0)
- \* Definition of Asset/Inventory ideas document, see and comment on links  
[https://docs.google.com/document/d/1NTGELHDdreuAWJjJZIGLPm5DU6cpa6s6pyV\\_45VXNL0/edit?tab=t.0](https://docs.google.com/document/d/1NTGELHDdreuAWJjJZIGLPm5DU6cpa6s6pyV_45VXNL0/edit?tab=t.0)

## ## Note

- \* CRA is the largest change in IT for 35 years
- \* Requires mission critical processes for all products
- \* Requires a new type of expertise to meet the needs of cyber security on a global scale
- \* CRA content application to SPDX

### Product Spec

- \* Product # needs a range of #s
  - \* This version or sub-components may be another supplier's product
  - \* composition requires additional relationship information inclusion tree
  - \* Need multiple product #s

- \* What information will be included in each specification?
- \* Do we need an agent related to this product specification? Covered in artifacts -- originatedBy - Mandatory property? (no) Originator vs maintainer - is the originator known
- \* Do we need a spec version? Yes
- \* 2 versions -- product and spec
- \* Spec is a core element
- \* Do we need a category or classification? Meaning of the name. - intended use for CRA
- \* Does "Product Specification" need to be part of a core? Item version

- \* How much of this product information do you need to disclose?
- \* Processes for consistency
- \* Information authorization
- \* Alex - Securing information is outside the scope of SPDX - SC has some interest related to security
- \*

### ## Action Items

- \* Product specification discussion related to the core.
- \* Item version - all profiles
- \* Example use of SPDX for CRA conformance - Greg's document needs to be reviewed.  
[https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCl0G52NTJhsV\\_P26BV9o/edit?tab=t.0](https://docs.google.com/document/d/1t-L2yt-zYLT3mtWC63Dy0PCl0G52NTJhsV_P26BV9o/edit?tab=t.0)

### ## Decision Items

- \* Need to merge all the PRs into hardware

2025-09-19

# # SPDX Hardware Team Meeting

2025-09-19

PR: <https://github.com/spdx/meetings/pull/967>

## ## Attendees

[x] Alfred Strauch  
[x] Steven Carbno  
[] Bob Martin (MITRE)  
[] Dishoungh White II  
[] Kate Stuart  
[] Victor Lu  
[X] Jim Vitrano  
[] Amit Kumar  
[X] Issac Asay  
[] Lucas Tate  
[] Apoorav Trehan  
[] Alex Volykin  
[] Allan Friedman  
[x] Greg Shue  
[] Riley Barelllo-Myers  
[] Henk Berkholz

## ## Agenda

- \* PR update - status
- \* Definition of Asset/Inventory ideas document, see and comment on links  
[https://docs.google.com/document/d/1NTGELHDdreuAWJjJZIGLPm5DU6cpa6s6pyV\\_45VXNL0/edit?tab=t.0](https://docs.google.com/document/d/1NTGELHDdreuAWJjJZIGLPm5DU6cpa6s6pyV_45VXNL0/edit?tab=t.0)

## ## Note

- \* Product supply chains need to be concrete. How did I get this product? Who, where, how
- \* Supply chain is a chain of supply chains dependent upon need and location in the supply chain. Different owners, buyers, sellers, and users
- \* Integrators need information related to options, locations, origin, price and cost.
- \* Product line needs to be refined in meaning
  - \* Addition to the idea product line -
  - \* Family of products with a specific sku
- \* Design and planning require a survey of products and related products.
- \* SKU - stock keeping unit (not a specific unit)
- \* A specific product is a unit
- \* Specific unit, product SKU information, followed by a grouping of sku's
  - \* When you deal with different manufacturers, ideas are broken (abstraction is not useful)

\* product source - location and specifications - impacts selection and business processes

types of products:

- Abstraction of specification - engineering processes
- **Product line (specific manufacturer), different SKU**
- **Product Specification -same SKU, model**
- Specific product unit - SN

## ## Action Items

\* Review information related to product lines, abstractions, etc

## ## Decision Items

2025-09-12

# # SPDX Hardware Team Meeting

2025-09-12

PR: <https://github.com/spdx/meetings/pull/968>

## ## Attendees

[x ] Alfred Strauch  
[x] Steven Carbno  
[x] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[ ] Kate Stuart  
[ ] Victor Lu  
[x] Jim Vitrano  
[x] Amit Kumar  
[ ] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[x] Alex Volykin  
[ ] Allan Friedman  
[ ] Greg Shue  
[ ] Riley Barelllo-Myers  
[ ] Henk Berkholz

## ## Agenda

- \* PR update - minor issues ProfileIdentifierType <https://github.com/spdx/spdx-3-model/pull/1103>
- \* Greg wants SC discussed in relation to Zephyr build and reusable sources
- \* Discuss the need for Supply Chain inventory - definition of inventory
  - \* abstract product - product line to specific product specification

## ## Notes

- \* CISA announce continued support for CVE SBOMs
  - \* Mitre will continue supporting the CVE - funding gap filled
- \* Bob discussed SCA event
  - \* Bob discussed various sources of new supply chain information and topics
  - \* Supply chains will be impacted and changed
  - \* How do you deflect attacks
  - \* AI and supply chains - CSF will deal with AI
  - \* Changes in oversight from government
  - \* Atlas Framework - Mitre development
    - \* attach honeypots and evaluations
  - \* AI is a attacker and target - AI is increasing the attach surface
    - \* AI is software with any additional component
  - \* Presented SPDX 3.1 in some details

- \* NIST working with semi conductor industry and risks related to supply chain = FAB evaluation
- \* Mechanics of the supply chain evidence NDIA
- \* UNTP discussed with DPP as a requirement for data and validation - supply chain
  - \* Lockheed spoke of need for DTs
- \* Synoptics wants to tie metadata to physical chips
- \* Issues with name validation related to companies, distributors and product suppliers
  - \* counterfeiting is a significant issue
- \* Zephyr - has the deliverable been defined - what is the minil functionality?
  - \* build process, executable process, - source file options as part of configuration related to deliverables
  - \* 2 deliverables build and configuration options
  - \* conformance baseline related to tool configuration
    - \* PKO may be a solution -- support desired out
- \* Inventory Definition: Key requirements
  - \* Defining what? anything
  - \* stock room quantities
    - \* an audit what and where
    - \* quality
    - \* review
  - \* related issues -- counterfeit,
    - What is the business problem?
    - What is the product specification? Is the product part of a version? Product line?
    - How do we count something without specification? Equivalents need to be tracked?
    - If we have unique part # that change within the chain does this solve issues of product specification
      - Is a part within a larger product will impact the certified of a restricted product?
      - CRA will demand a version different versions based on change?
      - Product equivalents based on manufacturers
      - HBOM compliance - used as inventory key management - used at point for purchase, transport and inclusion

## ## Action Items

- \* Work on defining inventory- Is this asset management?

## ## Decision Items

2025-09-04

# # SPDX Hardware Team Meeting

2025-09-04

PR: <https://github.com/spdx/meetings/pull/969>

## ## Attendees

[X] Alfred Strauch  
[X] Steven Carbone  
[X] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[ ] Kate Stuart  
[X] Victor Lu  
[X] Jim Vitrano  
[ ] Amit Kumar  
[X] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[ ] Allan Friedman  
[X] Greg Shue  
[ ] Riley Barelllo-Myers  
[ ] Henk Berkholz

## ## Agenda

- \* PR update
- \* Greg wants SC discussed in relation to Zephyr build and reusable sources
- \* need more business cases
- \* Discuss the need for Supply Chain inventory

## ## Notes

- \* Zephyr - process, tools - automated procedures to generate an exe
  - \* How do you organize and present info for compliance? Digital element, software, etc.  
What are the items of a product?
  - \* Software is not software until it is an exe? Clarify what items are involved and discussed? What are the concepts?
  - \* Binary vs exe vs code
  - \* aluminium ingot vs a purpose part - information adds context - bundle of elements or packages - everything is on a higher level
  - \* transfer of information between businesses - terminology needs to transcend concrete to deal with abstract - CRA is driving this deeper understanding
  - \* proprietary vs private information in chain
  - \* Sharing is necessary - why and how
  - \* SCITT - fish and chips use cases for
- \* Functional safety assurance - certificate of inspection "good until". How is this document?

- \* medication expires in warehouse - therefore expiry date or end date is required.  
Applies to assurance (will present process challenges).

- \* Next steps - PKO discussion

- \* how do you maintain links between simple and complex implementations (chain details)

- \* “and it contains” attestations - no tree breaks (ID or reference)

- \* Inventory management from the perspective of risk management - where, how much, model of relevance for supply chain using DT

## ## Action Items

## ## Decision Items

- \* “good until” is required for multiple operations in the evaluation result in FuSa

- \* inventory will not deal with pricing or sales

2025-08-29

# # SPDX Hardware Team Meeting

2025-08-29

PR: <https://github.com/spdx/meetings/pull/970>

## ## Attendees

[X] Alfred Strauch  
[X] Steven Carbno  
[X] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[ ] Kate Stuart  
[ ] Victor Lu  
[x] Jim Vitrano  
[X] Amit Kumar  
[ ] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[X] Alex Volykin  
[ ] Allan Friedman  
[X] Greg Shue  
[ ] Riley Barello-Myers  
[ ] Henk Berkholz

## ## Agenda

- \* PR update <https://github.com/spdx/spdx-3-model/pull/1098/files>

- \* Product vs Asset

- \* Product, asset, commodity

- \* Economic goods

- In this context, the term \*\*\*"product"\*\*\* is used in a broad sense to encompass not only conventional finished goods, but also raw materials classified as \*\*commodities\*\* and various forms of \*\*assets\*\* that hold economic value, including software. By adopting this definition, "product" serves as an umbrella term that represents items intended for consumption, inputs/outputs traded in markets, and resources held for investment or future benefit. This inclusive usage allows for clear discussion of concepts that share characteristics across these categories.

- \* Greg wants SC discussed in relation to Zephyr build and reusable sources

- \* State PR

- \* Definition of Supply Chain added to new profile

## ## Notes

- \* PR review

- \* state class added (name, description) - artifact

- \* State decision process was added

- \* state action added

- \* Defined state process - valid states (was defined state process)
- \* state change of material - this will be done
  - state class is more for abstract operations
  - end date added to fusa used in certificated or evidence (attestation)
- \* Product, assets and commodities - texted agreed to be used

## ## Action Items

- \* need mode business cases
- \* add new text for product definition

## ## Decision Items

- \* adding enhanced definition approved

2025-08-22

# # SPDX Hardware Team Meeting

2025-08-22

PR: <https://github.com/spdx/meetings/pull/963>

## ## Attendees

[X] Alfred Strauch  
[X] Steven Carbno  
[X] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[ ] Kate Stuart  
[ ] Victor Lu  
[ ] Jim Vitrano  
[X] Amit Kumar  
[X] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[ ] Allan Friedman  
[ ] Greg Shue  
[ ] Riley Barello-Myers  
[X] Henk Berkholz

## ## Agenda

- \* Changes to the hardware/supply chain profile to be discussed
  - \* The Instantiate hardware process is now a subclass of the create process
  - \* Do we need the “instantiatedby” relationship? Can use “hasoutput”
  - \* State action and state process - do we keep them?
  - \* Inspection action location is now optional
- \* Profile Statement for Supply Chain
  - \* Separate SC from HW in the profile
  - Option: A supply chain is the entire network of organizations, people, activities, information, and resources involved in the life cycle of a product or service from creation to disposal. It encompasses every phase, from sourcing inputs and components, through manufacturing and assembly, to warehousing, distribution, and final delivery to the end user.
  - \* Change the Use cases
- \* Plan for next phases - next few weeks

## ## Notes

- \* Discussed the separation of HW and the supply chain
  - \* instantiated moved - instantiatedby no longer needed
  - \* Use the term instantiate rather than instantiation

- \* ManufacturerProcess should probably be ManufactureProcess
- \* VM enueum added
- \* Decisions made include the addition of a description of hw and product
  - \* removed inspection location, hard to determine a location - who and when is important
  - \* modify removed HW
- \* State action and process
  - \* potentially important in operations
  - \* state is not an action or process - states are associated with a process "What is the state?"
  - \* State as output only - may need to use a "varifiedstate" verb as opposed to noun
    - \* definedstateaction or measuredstateaction
    - \* definedstateaction is a digest
    - \* product line vs product - connected
  - \* Revised definition:
 

Option: A supply chain is the entire network of organizations, people, activities, information, and resources involved in the life cycle of a product or service from creation to end-of-life. Supply chains encompass every phase, from sourcing inputs and components, through manufacturing and assembly, to storage, distribution, and final delivery to the end user.

## ## Action Items

- \* update github
- \* merge to dev branch
- \* next week Greg wants SC discussed in relation to Zephyr build and reusable sources

## ## Decision Items

- \* revisions accepted
- \* instantiatedby no longer needed

2025-08-15

# # SPDX Hardware Team Meeting

2025-08-15

PR: <https://github.com/spdx/meetings/pull/962>

## ## Attendees

[X] Alfred Strauch  
[X] Steven Carbno  
[X] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[ ] Kate Stuart  
[ ] Victor Lu  
[ X ] Jim Vitrano  
[ ] Amit Kumar  
[ X ] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ X ] Alex Volykin  
[ ] Allan Friedman  
[ X ] Greg Shue  
[ ] Riley Barelllo-Myers

## ## Agenda

- \* Need to redo the HW Profile [draw.io](https://github.com/spdx/spdx-3-model/issues/1075)
  - \* Issue: Merge conflict
  - \* Redo from the Development branch draw.io
- \* Hardware profile has been approved to be merged into the development branch
- \* Addition of hardware definition in glossary
  - <https://github.com/spdx/spdx-3-model/issues/1075>
- \* Any additional questions or thoughts related to the existing HW and supply chain profile.
- \* Question: Should Supply Chain be separated from Hardware Profile? This represented some large changes in structure.
- \* Plan for next phases - next few weeks

## ## Notes

- \* Discussion related to definitions in the glossary. The glossary is to be used for the SPDX generation not a description of general terms.
  - \* Glossary definition needs to be better defined
  - \* May need a glossary for SPDX in general, where all profiles will add to the glossary
  - \* Out Reach will be responsible for dealing with the glossary issue
- \* deal with a few definition issues within the hardware profile
- \* Supply chain discussion:
  - \* ie. Build profile is separate from software
  - \* Could sc track movement of bites (non material)

- \* If separated the sc profile could be used independently of hardware or software
- \* What is the impact? Tool builders will be impacted.
- \* Isaac does not feel he will be impacted by a change
- \* Amit needs to contact to obtain feedback on this topic.
- \* AI needs a supply chain
- \* Profile conformance is a key issue
- \* Evolution of profiles is better supported if separated
- \* SupplyChain is the new profile name
- \* "A supply chain is the documentation of the steps related to the creation, transport, and (use or delivery) of a product."
- \* clarifies the scope of SPDX
- \* profile conformance?

The supply chain profile documents events and processes associated with the lifecycle of a product, including its creation, transportation, usage, and decommissioning.

### ## Action Items

- \* Separate the hardware and sc
- \* Needs to be discussed at a tech meeting on Tuesday.

### ## Decision Items

- \* Proceed with changes to [draw.io](https://draw.io)
- \* Separate the hardware and sc

2025-08-08

# # SPDX Hardware Team Meeting

2025-08-08

PR: <https://github.com/spdx/meetings/pull/961>

## ## Attendees

[X] Alfred Strauch  
[X] Steven Carbno  
[X] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[ ] Kate Stuart  
[X] Victor Lu  
[X] Jim Vitrano  
[X] Amit Kumar  
[X] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[ ] Allan Friedman  
[X] Greg Shue  
[ ] Riley Barelllo-Myers

## ## Agenda

- \* Review outstanding PR - no outstanding PRs
- \* Discuss core requirements used in HW and Fusa
  - \* Requirements are core
  - \* PR will be created revise the HW requirements to coordinate with Fusa requirements
    - \* Review PR - move requirements from HW and create universal requirements for core
- PR: <https://github.com/spdx/spdx-3-model/pull/1073>
- \* Question:
  - \* Are there additional requirements needed to satisfy other profiles? Please advise.
- \* Develop Use Case examples
- \* Any other topics?

## ## Notes

Reviewed New Requirements PR for core. This is a revised definition that considers the requirements for hardware and Fusa. Please consult the PR for details.

The new requirements includes Fusa elements such as:

Amit Kumar approved use of their implementation examples in the summary and other presentations.

Reviewed details related to SPDX web site information.

The idea of the product needs to be revised. Greg has an issue. What is the more generic term for hardware? Product as a term is a replacement but it is broad and difficult narrow. .

- "Hardware" Is the term an issue.

SPDX is a system packaging data exchange. How users want to assemble all the different profiles to define a system. The question is: How do we articulate the new definition of hardware as a product.

- Glossary needs to be updated to deal with the definitions including hardware and new profiles
- Glossary should reflect profile definitions?

## ## Action Items

\* Glossary Update.- submit a issues <https://github.com/spdx/spdx-3-model/issues/1075>

## ## Decision Items

\* New requirements definition is fine

2025-08-01

# # SPDX Hardware Team Meeting

2025-08-01

PR: <https://github.com/spdx/meetings/pull/960>

## ## Attendees

[X] Alfred Strauch  
[X] Steven Carbo  
[X] Bob Martin (MITRE)  
[ ] Dishoungh White II  
[ ] Kate Stuart  
[ ] Victor Lu  
[X] Jim Vitrano  
[ ] Amit Kumar  
[X] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[ ] Allan Friedman  
[X] Greg Shue  
[X] Riley Barelllo-Myers

## ## Agenda

\* Problem from Isaac - Category field

\* Discuss: definition of "hardware" vs related (Greg Shue)

SEVOCAB ([Software and Systems Engineering Vocabulary \(SEVOCAB\)](#))- hardware. (1)  
physical equipment used to process, store, or transmit computer programs or data ( this  
Appears to be too narrow of a view, limits to just computer hardware and no virtual  
hardware)

Potential Definition of Hardware Vocabulary

New Definition: Hardware is any product, real or virtual. A product is tangible and is the  
result of labor, or of a natural or artificial process.

\* No new PRs

Actions and Processes

\* <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/OutOfSpecAction.md>

Definition enhancement:

OutOfSpecAction refers to a situation where a product, material, environment, or  
process fails to meet the established standards or predefined specifications or exceeds  
specification parameters. Any result or condition that goes beyond these predefined

parameters or thresholds is considered "out of specification," indicating a non-conformance or deviation that must be investigated and addressed to maintain product quality and regulatory compliance.

This term is often used in industries like manufacturing, pharmaceuticals, quality control, and regulatory compliance

\*<https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/ResolutionAction.md>

\* There are 2 issues: resolution relationship type is undefined and resolution is not a good definition for resolution type.

Solution: Existing Description - "For each ResolutionAction there is at least one /Core/Relationship class or subclass with the relationshipType of '**resolved**' on the from and an OutOfSpecAction class or subclass on the to."

Change 'resolution' to 'resolved'

Definition for 'resolved' - The 'to' OutOfSpecAction is resolved in the 'from' ResolutionAction

HW process and virtualization

\* The definition of instantiated needs to be updated.

Old

InstantiatedBy: The **to** Element is instantiated by the **from** Process.

New

InstantiatedBy: The **to** Element is instantiated by the **from** DefinedProcess

<https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Properties/productAgent.md>

ProductAgent properties do not match

Old Summary

Product Manufacture Name and related information.

New Summary

The Agent who is responsible for product branding such as an OEM.

Description

The Agent is responsible for defining the partNumber, batchNumber or serialNumber of **the** unit of hardware.

<https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Properties/additionalInformation.md>

Old Description

This element provides relevant information to the product.

new Description

This element provides relevant information **about** the product.

## ## Notes

- \* hardware types - Jason representation - definedtype - field called type
  - The 2 conflict - therefore cannot serialize in Jason Ld
  - Solution: Option "nameFromSource"
    - typeFromSouce agreed upon name change
- \* vocabulary definition of hardware
  - \* Greg Shue provided various definitions for commuting, hardware and devices
  - \* hardware has been used as a product - when is something computer hardware
    - \* Potential Definition of Hardware Vocabulary
    - New Definition: Hardware is any product, real or virtual. A product is tangible, immutable and is the result of labor, or of a natural or artificial process.
    - Any software product installed on a piece of hardware and the unit is made immutable, it is hardware.
  - Hardware is a device.
    - device. (1)** mechanism or piece of equipment designed to serve a purpose or perform a function
  - \* Once a chip with code is made immutable it becomes hardware - state change in life cycle
- \* All the recommended changes made to the HW profile above are approved as written.
- \* Bundle vs "contains"
  - \* Bundle is standard or non standard set of elements
  - \* contains describe an assembly or grouping of specific element

## ## Action Items

- \* Produce 1 or more PRs to submit approved changes

## ## Decision Items

- \* Discussion related to definition of hardware and product is required.
- \* No further revisions needed

2025-07-25

# # SPDX Hardware Team Meeting

2025-07-25

PR: <https://github.com/spdx/meetings/pull/958>

## ## Attendees

[X] Alfred Strauch  
[X] Steven Carbno  
[X] Bob Martin (MITRE)  
[X] Dishoungh White II  
[X] Kate Stuart  
[X] Victor Lu  
[X] Jim Vitrano  
[X] Amit Kumar  
[X] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ ] Alex Volykin  
[X] Allan Friedman  
[X] Greg Shue

## ## Agenda

- \* Review PRs - <https://github.com/spdx/spdx-3-model/pull/1060/files>
  - Store, location and time (actionStartTime and actionEndTime)
- \* Review of hardware profile sections from Riley, and Victor
- \* Review Businesses Cases - Kate Stewart will provide folder for Use Cases  
<https://drive.google.com/drive/folders/1hKGn3QpigpmhQ5KBRdtsUfxEPwkLcn3z>
  - \* Microsoft Traceability
  - \* SysAuditor - Smart Talk system auditing for compliance
- \* Here is a basic use (business) case template for business cases. Basically 3 paragraphs
  - Problem Description
  - Desired Outcome - Solution Requirements
  - How SPDX helps solve the problem

## ## Notes

- \* PR review was approved.
- \* amit kumar presented some details related to business case
- \* Greg Shue discussed the meaning of "Hardware". Here will review the spec and make recommendations.

- \* SysAuditor business case was reviewed
  - \* Bob commented on need to add non digital physical items may be needed as part of augmentation
- \* Victor - Is an FPGA hardware or software - Greg suggested if byte stream is changeable without intervention -- it is defined as software
  - \* model suggests it is Vhardware supported by the FPGA
- \* physical vs virtual may be better definition than "hardware" - "What is hardware?"
  - \* one X changeable ROM as programmable
  - \* type of device? Does programming a device change the hardware definition? See 1x use of silicon (EFuse) - should serial # change
- \* "Planned Future" should be future - storage process

### ## Action Items

PR for "Planned Future" should be future - storage process

### ## Decision Items

- \* Review the assignments of Victor and Riley for next meeting to finalize Profile

2025-07-18

# # SPDX Hardware Team Meeting

2025-07-18

PR: <https://github.com/spdx/meetings/pull/959>

## ## Attendees

[x ] Alfred Strauch  
[ x] Steven Carbno  
[ ] Bob Martin (MITRE)  
[ x] Dishoungh White II  
[ x] Kate Stuart  
[ ] Victor Lu  
[x] Jim Vitrano  
[x ] Amit Kumar  
[ x] Issac Asay  
[ ] Lucas Tate  
[ ] Apoorav Trehan  
[ x] Alex Volykin

## ## Agenda

- \* Review PRs - old (approved) and new
  - \* Discuss Store vs Storage
  - \* Action has location - do we need a storage location related to store
- \* Review Action Items assignments: as seen below (see assigned action items)
  - \* Please provide documentation of recommended changes
- \* Review of hardware profile sections from Riley, Bob, Jim and Victor
- \* Businesses Cases - SPDX requires the addition of Business Cases related to hardware and supply chain.

Here is a basic template for business cases. Basically 3 paragraphs

- Problem Description
- Desired Outcome - Solution Requirements
- How SPDX helps solve the problem

- \* Hardware page here is a example of security <https://spdx.dev/learn/areas-of-interest/security/>

### **TODO:**

#### **Definition:**

**Personas:** This profile may be produced or consumed by a variety of personas, including:

Software Developers: They use the information to understand how software is executed on hardware dependencies.

Security Analysts: They can leverage this data for vulnerability analysis and risk assessment.

Compliance Officers: This helps them demonstrate compliance with regulations that require supply chain transparency (e.g., GDPR, NIST).

Procurement Managers: They use it to understand the components in a system before purchasing or renewing licenses.

IT Administrators: They can leverage this information for inventory management and asset tracking purposes.

### **Use Cases:**

### **Benefits:**

The key benefit is having a common set of classes, properties and vocabularies provides a common “language” for communicating Hardware Bill of Materials concepts between producer and consumers. The Hardware profile also eases the burden for developers of tools.

### **## Notes**

- \* Reviewed Modification changes.
  - \* Store vs storage
  - \* storage is the intended storage of hardware in a location
  - \* Time issue related to the idea of storage
  - \* Prescribed vs intended related to processes
    - \* prescribed has a more specific
  - \* action location and storage location
    - \* may be different
    - \* storage needs cardinality
    - \* simplify by removing storage from storage
    - \* storage start time with no possible end time related to backup of data
- \* Amit's changes
  - \* all changes approved
- \* Jim presentation of changes
  - \* destroy start and end time processes may be problem for some processes such as format drives
  - \* use of term destruction is important - “unusable”
  - \* Applies to intentional and unintentional destroy - process needs to be defined as intentional - idea will be expanded related to inventory management
  - \* destroy action end time is optional - may not know end
  - \* validation of destroy action can be added through functional safety
  - \* Fire in warehouse destroys product - what is the start date?
    - \* Time as a point is a problem
    - \* start time is required
    - \* 2 states destruction vs not available - future issue - action = transition
  - \* Responsibility change action
    - \* similar time action issues - when does responsibility change?
    - \* define points of responsibility - loading, unloading,

- \* time range is an issue - one time - no end time for point in time
- \* responsibility changed on - vocabulary issue "on" is a time issue

## ## Action Items

Hardware and SC use cases

- \* Simplify by removing storage location from storage Action
  - \* Mandatory action location
- \* Responsibility - start time, endtime can be the same
- \* Responsibility changedOn - any change - universal use - improve description

## ## Decision Items

- \* Simplify by removing storage from storage
- \* Responsibility changOn - start/end time can be same

2025-07-11

# # SPDX Hardware Team Meeting

2025-07-11

PR: <https://github.com/spdx/meetings/pull/956>

## ## Attendees

- \* Alfred Strauch
- \* Steven Carbno
- \* Bob Martin (MITRE)
- \* Dishoungh White II
- \* Kate Stewart
- \* Victor Lu
- \* Jim Vitrano
- \* Amit Kumar
- \* Issac Asay
- \* Lucas Tate

## ## Agenda

- \* Review PRs - old and new
- \* Tech Team report hardware Profile update
  - \* Review Relationship issues (found during review)
    - \* islocatedAt: For ever from `element` located at a specific to `location`. A time period is optional.
    - \* affects - right for Vulnerability only.
    - \* creatorBy - we need to add
    - \* hasOutput - right now is build only but should change
    - \* hasInput- right now is build only but should change
    - \* hasResolution- we need to add.

- \* Review Hardware Profile Description and summary update:

Old Summary

The Hardware Profile provides additional metadata that is useful for hardware.

Revised 25-07-11

The Hardware Profile provides metadata that describes hardware and its supply chain.

Old Description

The Hardware namespace defines concepts related to hardware, including virtual hardware, supply chain and its characteristics.

Revised Description 25-07-11

The Hardware namespace defines metadata related to physical and virtual hardware including its supply chain and properties.

### New Summary

The hardware profile provides physical and virtual hardware metadata from components and the source of any component within a defined supply chain.

### New Description

The hardware namespace supports the detailed definition of physical and virtual hardware representation of hardware through the documentation of metadata. The hardware supply chain supports the supply chain detail based on component level and component decomposition.

- \* Review Action Items assignments: as seen below (see assigned action items)
- \* Next step for HW WG
  - \* Work through some examples (volunteers?)
  - \* Core examples

### ## Notes

- \* Provided a walk through of HBOM and SC for Dishoungh White II
  - \* will provide use cases for next meeting
- \* Noted that Amit provided feedback related to assignment on revisions
- \* Reviewed profile updates
- \* Reviewing Amits Notes:
  - \* Creation action will not be changed at this time
  - \* Product vs hardware - product is best choice
  - \* CreationProcess vocabulary will be changed as suggested by Amit - Summary needs to have fewer - remove "abstract process class" to simplify
  - \* Assembly process description -
  - \* HarvestAction change to match HarvestProcess
- \* Action Taken as a term in the action class description
- \* New assignment - Provide Uses cases for addition to release information

### ## Assigned Action Items

- \* Review of profile will be assigned for review by sections:

Instructions:

Requirement: We need to ensure each description is clear, accurate and relevant. In the event a class appears to not be relevant, please note the reason why and any recommendations related to that class.

Process: Please review at your convenience. Once completed, please submit the recommendation document to the HW group list. [spdx-hardware@lists.spdx.org](mailto:spdx-hardware@lists.spdx.org) before the next meeting on July 11.

Review process: Review summary and description for clarity. Ensure relationships are relevant and accurate. If a potential relationship should be included please note the enhancement.

- Create action and process - Amit

- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/CreateAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/CreateProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/AssemblyAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/AssemblyProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/HarvestingAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/HarvestingProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ManufacturerAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ManufacturerProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ReproduceAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ReproductionProcess.md>
- Use action and process - Riley
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/UseAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/UseProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/InspectionAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/InspectionProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/OutOfSpecAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/PlanAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/PlanProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ResolutionAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/StateAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/StateProcess.md>
- Modify Actions and process - Issac

- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ModifyAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ModifyProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/TransportAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/TransportProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ChangeAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ChangeProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/StorageAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/StorageProcess.md>
- Boundary definition/Action and processes - Bob
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/BoundaryCrossingAction.md> - “planned future” use one of the words - not both.
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/BoundaryDefinitionAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/BoundaryDefinitionProcess.md>
- Destroy and - Jim
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/DestroyAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/DestroyProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ResponsibilityChangeAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/ResponsibilityChangeProcess.md>
- Initialize HW process and virtualization - Victor Lu
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/InstantiationVirtualHardwareProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/VirtualHardware.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/Hardware.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/PhysicalHardware.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla sses/BulkHardware.md>

## ## Action Items

- \* Everyone needs to complete assignments for next week.
- \* Hardware and SC use cases

## ## Decision Items

- \* Changes based on Amit's recommendations and agreed upon will be indeed to a PR
- \* HarvestingAction and HarvestingProcess will be changed to HarvestAction and HarvestProcess

2025-06-27

# # SPDX Hardware Team Meeting

2025-06-27

PR: <https://github.com/spdx/meetings/pull/955>

## ## Attendees

- \* Alfred Strauch
- \* Amit Kumar
- \* Bob Martin
- \* Victor Lu
- \* Steven Carbno
- \* Riley Barelllo-Myers
- \* Issac Asay
- \* Jim Vitrano
- \* Lucas Tale

## ## Agenda

- \* Tech Team report for moving Hardware Profile to merge into development
    - \* Any items to be cleaned up - please review the profile in detail
    - \* Tech Team will provide a date next week
  - \* Review of islocatedAt - build definition
    - \* islocatedAt : For ever from `element` located at a specific to `location`. A time period is optional.
    - \* generalized to elements or agent specific?
  - \* specification class Update #1028 optional parameters
    - \* <https://github.com/spdx/spdx-3-model/pull/1028/files>
    - \* <https://github.com/spdx/spdx-3-model/pull/1024/files>
- Arthit Suriyawongkul
- \* remove not needed class "Action Event Data" #1033
    - <https://github.com/spdx/spdx-3-model/pull/1033>
    - Needs to signed off by Gary or Kate

## ## Notes

- \* Need a road map and check points for next phases for the Hardware WG
- \* Should "islocatedAt" be usable by any element?
  - \* No need to restrict to agent
  - \* ie storage, installation, in use or agent action
  - \* new relationship type - to and from
  - \* likened to location log
- \* <https://github.com/spdx/spdx-3-model/pull/1028/files> needs to merged - update a property name
- \* Request for PR 1033
- \* Functional safety needs to be part of HW BOM - compliance - proof000

- \* Operations are HW has connection related to configuration ie VM
- \* Cancel meeting next week - holidays

## ## Action Items

- \* PR will be added to implement "islocatedAt"
- \* Arthit Suriyawongkul will be contacted to complete PR
- \* Code structure needs to be reviewed in detail
- \* Review of profile will be assigned for review by sections:

Instructions:

Requirement: We need to ensure each description is clear, accurate and relevant. In the event a class appears to not be relevant, please note the reason why and any recommendations related to that class.

Process: Please review at your convenience. Once completed, please submit the recommendation document to the HW group list. [spdx-hardware@lists.spdx.org](mailto:spdx-hardware@lists.spdx.org) before the next meeting on July 11.

Review process: Review summary and description for clarity. Ensure relationships are relevant and accurate. If a potential relationship should be included please note the enhancement.

- Create action and process - Amit
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/CreateAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/CreateProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/AssemblyAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/AssemblyProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/HarvestingAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/HarvestingProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/ManufacturerAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/ManufacturerProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/ReproduceAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/ReproductionProcess.md>
- Use action and process - Riley
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Cla/sses/UseAction.md>

- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/UseProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/InspectionAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/InspectionProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/OutOfSpecAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/PlanAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/PlanProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/ResolutionAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/StateAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/StateProcess.md>
- **Modify Actions and process - Issac**
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/ModifyAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/ModifyProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/TransportAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/TransportProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/ChangeAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/ChangeProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/StorageAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/StorageProcess.md>
- **Boundary definition/Action and processes - Bob**
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/BoundaryCrossingAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/BoundaryDefinitionAction.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/BoundaryDefinitionProcess.md>
- **Destroy and - Jim**

- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/DestroyAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/DestroyProcess.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/ResponsibilityChangeAction.md>
- <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/ResponsibilityChangeProcess.md>
- Initialize HW process and virtualization - Victor Lu
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/InstantiationVirtualHardwareProcess.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/VirtualHardware.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/Hardware.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/PhysicalHardware.md>
  - <https://github.com/spdx/spdx-3-model/blob/profile-hardware/model/Hardware/Classes/BulkHardware.md>

\* Next step for HW WG

- \* Work through some examples
- \* Core examples

## ## Decision Items

- \* "islocatedAt" will be implemented as a general use with elements  
<https://github.com/spdx/spdx-3-model/pull/1024/files>
- \* Cancel meeting next week(July 4) - holidays
- \* Review of HW Profile in detail by multiple people to ensure accuracy

2025-06-20

# # SPDX Hardware Team Meeting

2025-06-20

PR: <https://github.com/spdx/meetings/pull/954>

## ## Attendees

- \* Alfred Strauch
- \* Jim Virano
- \* Steven Carbno
- \* Riley Barelllo-Myers
- \* Issac Asay

## \*## Agenda

### \* Review PR

- \* Eternal IDs additions - hardware/organizations (approved and merged)

<https://github.com/spdx/spdx-3-model/pull/1029>

DefinedType: (approved and merged)

<https://github.com/spdx/spdx-3-model/pull/1027>

### \* Organization relationship “hasLocation”

- creation info issue with multiple locations
- “isAt” relationship

### \* review location comparison with new GS1 <https://ref.gs1.org/voc/PostalAddress>

### \* Ilan Schifter will continue discussion on digital location

### \* Tech Team agreed to remove “Action Event Data” - not needed

- PR - <https://github.com/spdx/spdx-3-model/pull/1033>

## ## Notes

- \* Bundle will be used to represent a machine
- \* PRs approved
- \* New PR for Action Event Data will be removed as a class
- \* Location discussion - “isAt” and “hasLocation”
  - \* isAt is a time window definition of location
  - \* what is impact of isAt - virtual vs physical
  - \* is “islocatedAt” a better designator
    - \* is there a exclusivity issue - islocatedAt vs has locatedAt (multiple locations)
  - \* From this item to a location(s) - 1 to 1 defines as exclusive
- \* islocatedAt includes time and location -
- \* GS1 - map to GS1 or not

## ## Action Items

- \* clearly defined islocatedAt

- \* Clarify with Kate Stewart related to strong adherence to GS1 or general mapping
- \* Discuss with TechTeam approval for Hardware Profile

## ## Decision Items

- \* "islocatedAt" is preference (supports multiple locations - non exclusive)

2025-06-13

# # SPDX Hardware Team Meeting

2025-06-13

PR: <https://github.com/spdx/meetings/pull/953>

## ## Attendees

- \* Alfred Strauch
- \* Jim Virano
- \* Steven Carbno
- \* Alex Volykin
- \* Ilan Schifter
- \* Isaac Asay
- \* Riley Barelllo-Myers
- \* Bob Martin (MITRE)
- \* Victor Lu

## \*## Agenda

### \* Review PR

- \* Eternal IDs additions - hardware/organizations (waiting for Kate's approval)

<https://github.com/spdx/spdx-3-model/pull/1029>

DefinedType: (waiting for Kate's approval)

<https://github.com/spdx/spdx-3-model/pull/1027>

- \* Ownership responsibilities related to Amit's request - creation info issue with multiple locations

- \* Ilan Schifter will continue discussion on digital location

- \* Discussion related to "What is a machine?" virtual and physical (Part of followup for Ilan)

- \* Ownership and responsibilities (@relationship) - purpose (elementpurpose)

Ilan Schifter

## ## Notes

- \* Addition of ID to core

- \* Defined type (core) will replace defined hazard and other properties

- \* <https://github.com/spdx/spdx-3-model/pull/1029> will be added to core

- \* Definedtype will be added to core

- \* category as opposed to summary - Hardware only for now

- \* related to standard

- \* may be needed in other profiles - categorize other elements

- \* Ownership issue - Amit added issues related to organization types

- \* location address for each is necessary

- \* multiple roles related to a given location

- \* need to be able to have traceability related to multiple locations, organizations and product numbers

- \* This product was built at...?

- \* Amit presented graphs related to multiple orgs with different roles. Do we capture only head office locations or do you have a more granular discussion
  - \* need idea of site (ids for different locations)
  - \* responsibility of change agent can be used to designate type of action
  - \* Need to have key associated with organization
- \* security is an extension of the solution - Scope creep is an issue  
<https://www.opencompute.org/wiki/Security>
- \* Discuss bundle related to virtual machines - no memory chips but have memory space
  - \* How do we identify a virtual system? - AI - What GPU does training occur?
  - \* Parameter list:
    - \* virtual or not - is it a real machine
    - \* Build for use cases as opposed to dealing with full definition issue
    - \* bundle is a high level description of for VM

Comments from group:

- \* hasLocation is used to define site - associated with creationInfo
- \* Organization IsAt PhysicalLocation or Organization hasLocation PhysicalLocation
- \* Just "has"?

### ## Action Items

- \* Finalize discussion on location, relationships and organization - creation info and agent

### ## Decision Items

- \* Bundle will be used to represent a machine
- \* ID will be added to core
- \* DefinedType will be added core

2025-06-06

# # SPDX Hardware Team Meeting

2025-06-06

PR: <https://github.com/spdx/meetings/pull/952>

## ## Attendees

- \* Alfred Strauch
- \* Jim Virano
- \* Steven Carbno
- \* Ilan Schifter

## ## Agenda

- \* Review PR
  - \* Eternal IDs additions - hardware/organizations  
<https://github.com/spdx/spdx-3-model/pull/1029>
- \* Ownership responsibilities related to Amit's request - creation info issue with multiple locations
- \* Ilan Schifter will continue discussion on digital location
  - \* build an example for dlocation
  - \* location will have minimal attributes
  - \* physical location will be contain attributes
  - \* digital location will be expanded based on research and agreement by group

## ## Notes

- \* reviewed PR related to external IDs -- identification concepts in element class
- \* Amit issue discussed - identification of a location in relation to creation info. - may need creation agent
- \* Ilan Schifter discussion on location:
  - \* see Ilan's provided notes - persistent, ephemeral
  - \* different formats, hardware, protocols
  - \* SC provenance and resolution needed to ID processes
  - \* Property properties
    - \* data type and object properties
    - \* file with relationship type (from) - location to location
    - \* dot example
    - \* What is the starting point for relationships?
    - \* uses software agent for descriptions
  - Discussed connection of location to hardware class
    - \* How do you minimize detail related to hardware?
    - \* need a name to call the virtual environment - bundle, agent, ....
  - \* Kubernetes cluster as an agent or entity - performs actions

\* How do you define the agent? Package with configuration ?  
operations issue

\* Link to DOT demo

\* Link to presentation

#### Decissions

- PR related to external ID is approved by group  
<https://github.com/spdx/spdx-3-model/pull/1029>

#### ## Action Items

\* followup conversation related to bundles and VMs

2025-05-30

# # SPDX Hardware Team Meeting

2025-05-30

PR: <https://github.com/spdx/meetings/pull/951>

## ## Attendees

- \* Amit Kumar
- \* Alfred Strauch
- \* Jim Virano
- \* Steven Carbno
- \* Bob Martin (MITRE)
- \* Ilan Schifter
- \* Lucas Tate
- \* Alex Volykin
- \* Ilan Schifter
- \* Isaac Asay
- \* Riley Barelllo-Myers

## ## Agenda

- \* taxonomy type (namespace) is now called definedtype and is being moved to core - discussed at Tech Meeting
  - \* Definedtype is replacing definedhazard and taxonomy class
- \* Amit Kumar External IdentifierType
- \* Ilan Schifter will continue discussion on digital location
  - \* location will have minimal attributes
  - \* physical location will be contain attributes
  - \* digital location will be expanded based on research and agreement by group
- \* Amit Kumar kind of location is this can be captured in one of the attributes e.g. LocationType in Physical Location {“Headquarters”, “Factory”, “Retail”, “Warehouse”, “others” }

## ## Notes

- \* Discussed changes from taxonomy to “DefinedType”
  - DefinedType will be in core
  - Changes hazard to work as part of hazardtype
  - Examples of definedtype were provided
  - Ilan discussed the use cases and questioned use in core
    - Allows you to define class type - class and specification
    - Adds context to a flag (type)
  - Term might be an alternative name for type - dictionary
- \* Amit Kumar kind of location is this can be captured in one of the attributes e.g. LocationType in Physical Location {“Headquarters”, “Factory”, “Retail”, “Warehouse”, “others” }

\* Hardware - GTIN - Global Trade Item Number (GTIN) can be used by a company to uniquely identify all of its trade items. [Global Trade Item Number \(GTIN\) | GS1](#)

1. HS Codes - The Harmonized System (HS) of tariff nomenclature is an internationally standardized system of names and numbers to classify traded products. [World Customs Organization](#)

## 2. Organization

1. GLN - Global Location Number (GLN) can be used by companies to identify their locations. [Global Location Number \(GLN\) | GS1](#)
2. DUNS - The Dun & Bradstreet D-U-N-S Number is a unique nine-digit identifier for businesses. [D-U-N-S Number Questions: Start Here - Dun & Bradstreet](#)
3. LEI - The Legal Entity Identifier (LEI) is a 20-character, alpha-numeric code based on the ISO 17442 standard developed by the International Organization for Standardization (ISO). [Identifying Organizations - the Legal Entity Identifier \(LEI\) - Organizational Identity - GLEIF](#)
4. GLUID - GLobal Unique Enterprise (GLUE) Identifiers. [draft-ietf-spice-glue-id-00 - GLobal Unique Enterprise \(GLUE\) Identifiers](#)

\* Different types of locations are defined as part of an action type as in a factory, etc.

\* Headquarters exist in different countries.

- \* Global headquarters

- \* need better identifiers for traceability

- \* locationType property

- \* headquarters is a corporate headquarters

\* Relationship between organization, sub units and location is needed

\* Goal is to support the identification of corporate structures independent of the supply chain

## ## Decissions

\* Changes to definedtype accepted along with move to core

\* Create a PR for adding external identifier type vocabulary

## ## Action Items

\* discuss the issue location will continue

\* Ilan will present digital location next week

2025-05-23

# # SPDX Hardware Team Meeting

2025-05-23

PR: <https://github.com/spdx/meetings/pull/950>

## ## Attendees

- \* Amit Kumar
- \* Alfred Strauch
- \* Jim Virano
- \* Steven Carbno
- \* Bob Martin (MITRE)
- \* Ilan Schifter
- \* Apoorav Trehan

## ## Agenda

- \* taxonomy type (namespace) to core as suggested by Isaac - FuSa recommended keeping it in hardware because of a similar idea in SBOM.
- \* PRs being reviewed by Kate for approval
- \* Ilan Schifter will continue discussion on digital location
  - \* location will have minimal attributes
  - \* physical location will be contain attributes
  - \* digital location will be expanded based on research and agreement by group

## ## Notes

- \* Name space conversation focused on use in hardware only
  - \* will be used in conjunction with location
- \* External identifiers in HW HS codes (Global hardware, GS1, org IDs)
  - \* entry name can be added to PR
- \* need to reference another SPDX doc.
  - \* external reference outside SPDX
  - \* externalMap is a pointer to SPDX related components
- \* Location requires a point a reference point - starting point
  - \* ie CAN bus link point is a reference point - other points are in reference to that point

- \* Location will have optional start and end times

## PRs

- \* taxonomy or name space for groups of items. What is a CPU?
  - \* taxonomy name is confusing
  - \* defines object sets as opposed to structures
  - \* Provide an example in PR
- \* What is a defined "Hazard" or "Taxonomy"? Definition and value

- \* “Defined Element” or type - link from defined object - “External definition”
- \* “DefinedType” definition - hazard and taxonomy

## ## Decisions

- \* “DefinedType” definition - hazard and taxonomy

## ## Action Items

- \* Amit’s list of identifiers will be sent to HW list and we will create a PR for next week

2025-05-16

# # SPDX Hardware Team Meeting

2025-05-16

PR: <https://github.com/spdx/meetings/pull/949>

## ## Attendees

- \* Amit Kumar
- \* Alfred Strauch
- \* Jim Virano
- \* Steven Carbno
- \* Bob Martin (MITRE)
- \* Ilan Schifter
- \* Lucas Tate

## ## Agenda

- \* Review Approve PR for taxonomy types (namespace)  
<https://github.com/spdx/spdx-3-model/pull/1027>
- \* Clarify issues related to Digital Location
- \* PR related to Specification - defined properties  
<https://github.com/spdx/spdx-3-model/pull/1028>
- \* Discuss outstanding PRs:  
<https://github.com/spdx/spdx-3-model/pull/1025/>  
<https://github.com/spdx/spdx-3-model/pull/1024>
- \* Update group related on progress related to FuSa, S-AI and Cryptology

## ## Notes

Provided an overview to Lucas Tate, Department of Energy

Taxonomy type - added additional information

- Taxonomy class
- Specification objects

Name space should be moved into core so you can name "Specific Industry or segment"

- Would like Name space to be included in core
- Industry could be added to hardware ???

Recommendation to ensure relationships definitions are clear and specific

Add reviewer permissions to PRs- Art, Ilan, Gary

Digital Location:

- Ilan presents -
- Persistent, multi layered
  - Framework
  - Access
  - Location
- Multi Environment

- Software
- Hardware
- Provenance/Linkage
  - Currently no way to detect attack

#### Resource TType

- Network
- Cloud
- Kerbinetes
- Containers
- Files
- Snippets

#### Need to consider process with Dlocation

- Locator
- Locator type
- Object properties
  - Alternate location
  - Nested
  - GPS, street
  - Relationship: contains - from, to

#### ## Decisions

- \* Name space approved for Hardware [1027](#)
- \* Need to discuss moving name space to core
- \* Specification update PR [1028](#) approves
- \* 1024 and 1025 PR review to resolve issues
- \* Ilan will continue with Dlocation research

#### ## Action Items

- Consider moving taxonomy type (namespace) to core as suggested by Isaac
  - To define sectors
  - Can be used to define AI agent types

2025-05-09

# # SPDX Hardware Team Meeting

## 2025-05-09

<https://github.com/spdx/meetings/pull/948>

### ## Attendees

- \* Amit Kumar
- \* Alfred Strauch
- \* Jim Virano
- \* Steven Carbno
- \* Alex Volykin
- \* Bob Martin (MITRE)
- \* Ilan Schifter

### ## Agenda

- \* Review decisions from TechTeam related to evidence and other issues
  - \* Additional or changes of values
- \* Addition to PR to be discussed: Name space addition
- \* Discuss with group approach related to release of HBOM
- \* Discuss ideas to deal with Digital Location
- \* Discuss new PRs

### ## Notes

- \* Discussed regulation class - Spec may be optional
  - \* external ID and reference required for standards
  - \* may not be public therefore link may be available outside an org.
  - \* no external reference available
  - \* date/time not important - some use version
    - \* revisions need to be considered
    - \* release date is not clear
    - \* Agents must have SPDX ID
- \* Name space for additional IDs - optional values for categorization
  - \* name is taxonomy
  - \* taxonomy is used to accurately define specific items
- \* Digital location discussion
  - \* Ilan - Digital location (no properties) with (1+) locator URI pointing to 1 location
    - \* Network location - optional description solutions (Kerbinetis considerations)
      - \* Suggested proprietary information is included - sharing is an issue
      - \* Container mapping - Where is the information needed for analysis
      - \* How low do we go?
      - \* multiple protocols

- \* File location'
- \* Need hardware associated with dlocation
  - \* defined by relationship
  - \* starting point creates a point of relevance to locate items
- \* Unified network ontology ideas

## ## Decisions

- \* Only SPDX ID and external ID is mandatory in specification
- \* Agreement of name space addition - originally requested by Isaac
- \* Agreement that Hardware profile needs to be finalized ASAP

## ## Action Items

- Create PR related to specification mandatory changes

2025-05-02

# SPDX Hardware Team Meeting 2025-05-02

PR: <https://github.com/spdx/meetings/pull/941>

### ## Attendees

- Alfred Strach
- Steven Carbno
- Bob Martin
- Nicole Pappler
- Kate Stewart
- Jim Vitrano
- Amit Kumar

### ## Agenda (please add new topics to the end of the list)

- Approve previous minutes <https://github.com/spdx/meetings/pulls>
- Prep for talking to Operations Profile
- Isaac case study - pushed to next week as separate meeting.

### ## Notes

- Ilan unable to join - family issue
- Amit to share document with use case -
  -  Proposed Template for Hardware Bill of Materials (HBOM) for Traceability
- Discussed operations - what is needed related to operations
  - Mitre work - <https://saf.mitre.org/>
  - Configurations and impact
  - Security related issue
  - Policy related issue apply
- Reviewed Operations Profile
  - Open questions on what needs to be software profile; handling specifications/standards/...

# Minutes Template

# # SPDX Hardware Team Meeting

## 2025-MM-DD

### ## Attendees

- Name (Order alphabetically)
- 

### ## Agenda (please add new topics to the end of the list)

- Approve previous minutes <https://github.com/spdx/meetings/pulls>
- Prioritise agenda
- 

### ## Notes

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