Framing

NTIA Software Supply Chain Transparency

January 13, 2021

Framing Working Group

Managed with love and patience by co-chairs Michelle Jump and Art Manion

Meeting almost weekly since July 2018

- Fridays at 1400 EDT
- https://lists.sei.cmu.edu/mailman/listinfo/ntia-sbom-framing

Framing concepts that apply to the entire multi-stakeholder process

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Agenda

1. SBOM refresher
2. New draft documents – finalizing comment resolution
    1. Sharing and Exchanging SBOMs
    2. Software Identification Challenge and Guidance
3. Expected upcoming work
    1. “VEX”
    2. Glossary
4. Considerations for Further Work
    1. Beyond baseline
    2.Integrity/Authenticity/Provenance

Refresher: What is an SBOM?

Framing Software Component Transparency: Establishing a Common Software Bill of Material (SBOM)

https://tinyurl.com/y7s8ab3t

"An SBOM is effectively a nested inventory, a list of ingredients that make up software components."

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2 What is an SBOM?

2.2 Baseline Component Information

2.4 Component Relationships

4 SBOM Processes

4.1 SBOM Creation: How

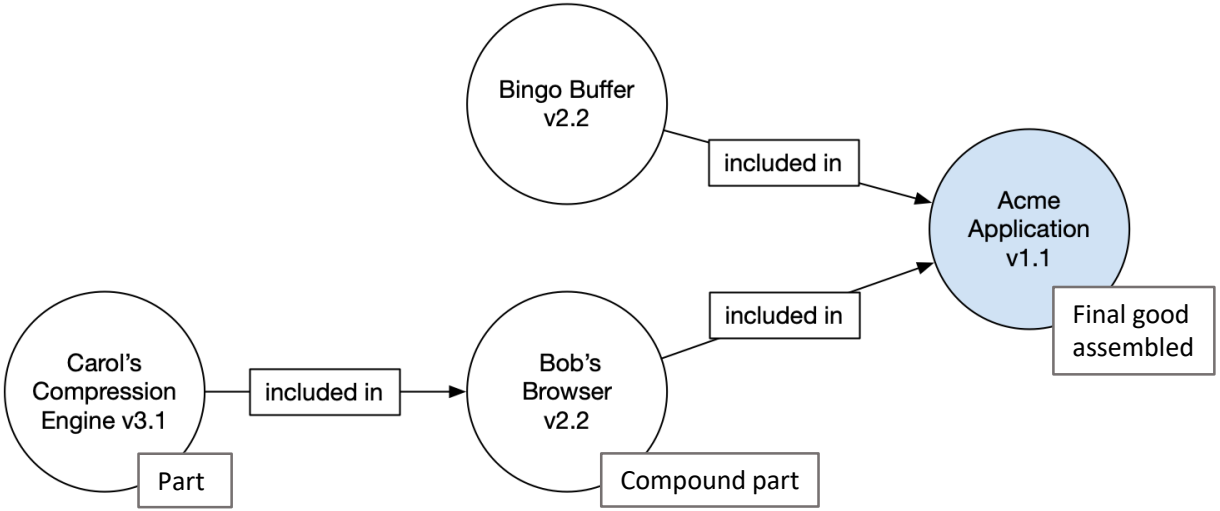
4.2 SBOM Creation: When

4.3 SBOM Exchange

4.4 Network Rules

4.6 Applications of SBOMs

5 Terminology



Component Name	Supplier Name	Version String	Author	Hash	UID	Relationship
Application	Acme	1.1	Acme	0x123	234	Self
|--- Browser	Bob	2.1	Bob	0x223	334	Included in
|--- Compression Engine	Carol	3.1	Acme	0x323	434	Included in
|--- Buffer	Bingo	2.2	Acme	0x423	534	Included in

Two Discussion Papers – Now Released

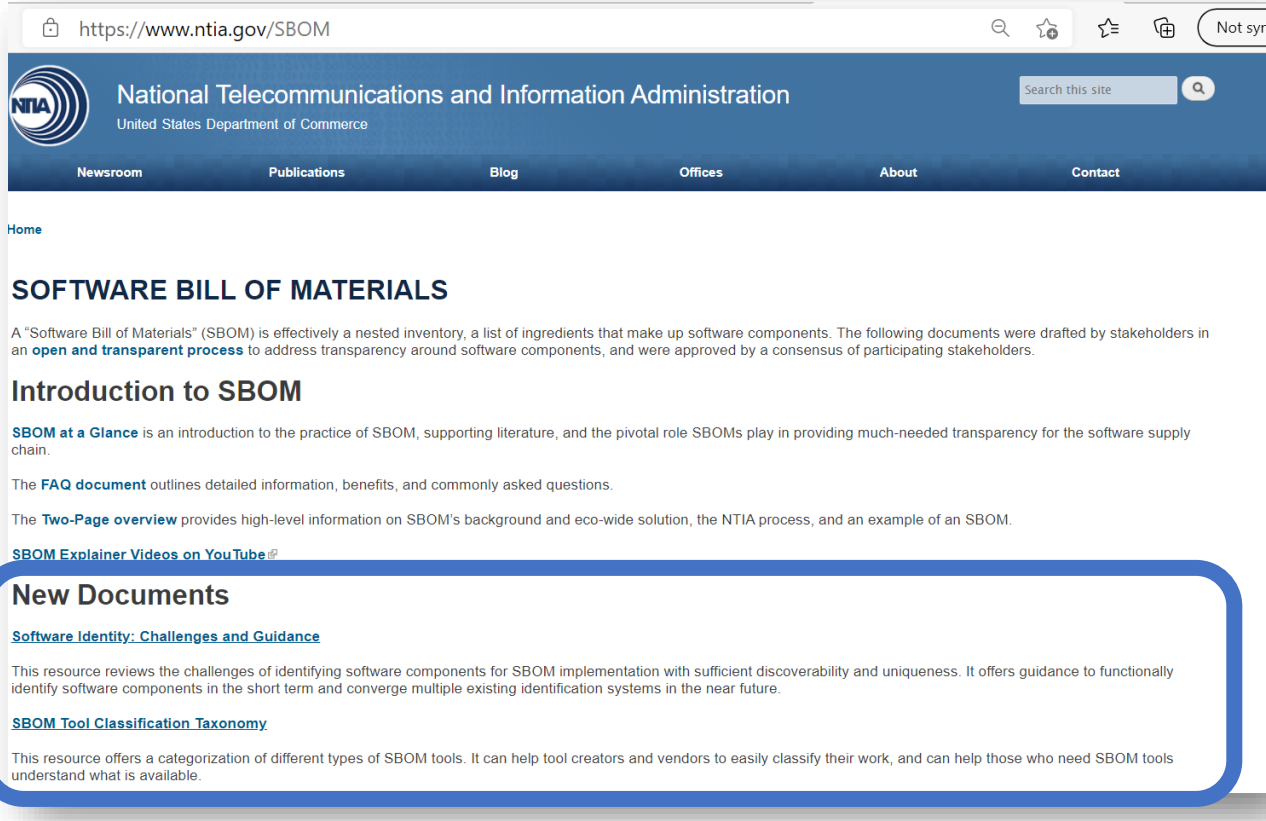
Sharing

Identity

Two New Papers Released

Available at: [SOFTWARE BILL OF MATERIALS | National Telecommunications and Information Administration (ntia.gov)](ntia.gov).

1. Sharing and Exchanging SBOMs
2. Software Identification Challenge and Guidance



Sharing and Exchanging SBOMs

"Transparency in the supply chain enables better risk decision-making for producers and consumers of software. This means that information about the underlying software components in a piece of software—a Software Bill of Material (SBOM)—should be accessible to the right entities at the right time."

Programmatic end system SBOM sharing

- Goal
  - An IETF standard
  - Discover SBOM, determine its format and an appropriate retrieval mechanism
- Method
  - Provide a simple model
  - Use of existing network discovery functions to access it (MUD, DHCP, certificate attributes)
  - Be content neutral: support SPDX, CycloneDX, and anything else
- Status
  - Adopted by IETF Ops Area Working Group
  - Early code developed
  - More work needed to add “VEX” capability
- https://tools.ietf.org/html/draft-ietf-opsawg-sbom-access-00

YANG model:

```
+--rw sboms* [version-info]
      +--rw version-info        string
      +--rw (sbom-type)?
        +--:(url)
        |  +--rw sbom-url?      inet:uri
        +--:(local-uri)
        |  +--rw sbom-local*    enumeration
        +--:(contact-info)
          +--rw contact-uri?   inet:uri
```

Software Identification Challenges and Guidance

"Possibly the biggest single challenge to supply-chain transparency and the SBOM model is the difficulty in identifying software components globally... This paper captures some of the major challenges… and offers some guidance on how to address these challenges."

Ongoing Efforts

Framing: Focus Areas Within Phase II

- **Is the baseline accurate and effective?**
  - Reviewing baseline to clarify and detail beyond baseline info
- **VEX: How do we understand the exploitability status of a particular vulnerability?**
  - Vulnerability exploitability status
- **Glossary: Let's all speak the same language**
  - Common set of terms

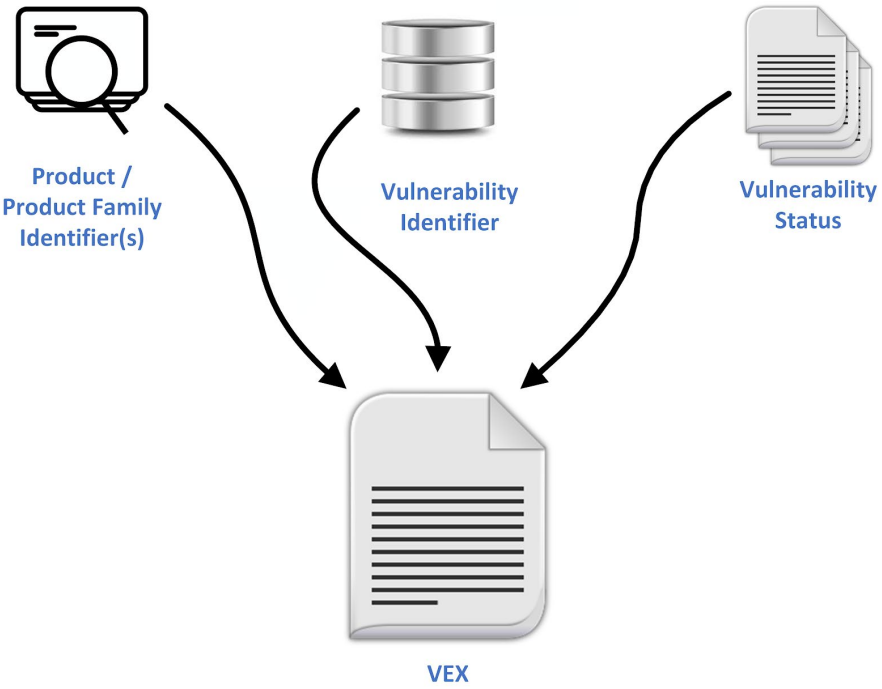
Framing Group Report: Under Revision

- Baseline:
  - Clarifying from past year of experience
  - NOT significantly changing the baseline
- Beyond the Baseline
  - Providing more context for value of moving beyond the baseline

- Other minor editorial/clarification changes that have been identified since initial release

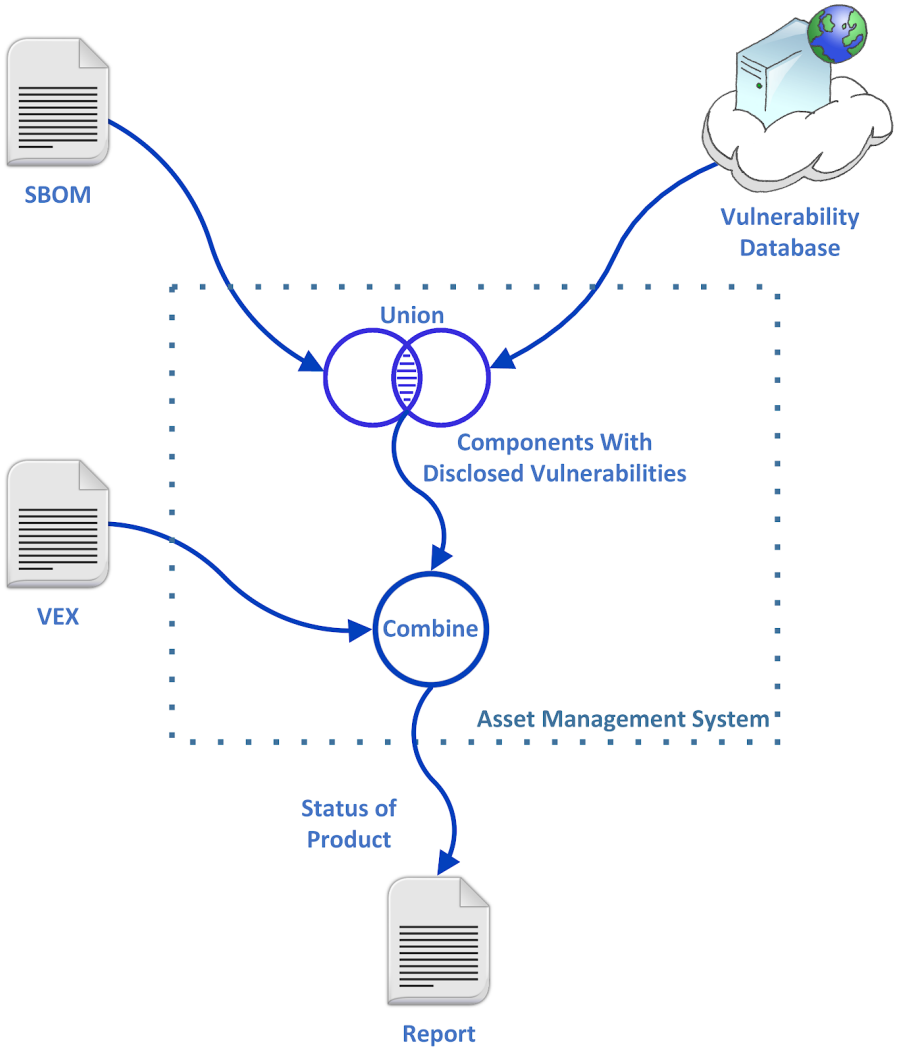
Vulnerability Exploitability eXchange (VEX)

- Is a piece of software (component!) actually affected by a vulnerability?
- Claims about impact from a particular author
  - Can come from the supplier or a third party
- Many but not all use cases associated with SBOM
- Separate from SBOM, but linkable



VEX + SBOM example

- Software includes a vulnerable component
- SW supplier determines that the vuln doesn't affect the built software
  - E.g., relevant code isn't included by compiler
  - E.g., relevant code is present, but not used or exposed
- Supplier issues a VEX with the claim that the component is "not affected" and no action is required
- Consumer integrates SBOM data, vulnerability data, and VEX data to make some risk-based decision



An initial approach to VEX data

Vex Data Fields	
VEX targets	Component identifier(s) or component family identifier
VEX metadata	• Identifier string for the VEX • Author • Author-role • Timestamp • Integrity/Signature/etc • SBOM identifier (optional)
For each vulnerability identified	• Vulnerability identifier • Vulnerability status (Machine readable) • Further vulnerability details • Affected component (optional)

Link to SBOM

Progress on VEX

- Aligning as a profile for the OASIS Common Security Advisory Framework (CSAF) standard
  - Mapping the minimum fields for CSAF and VEX
  - Hope to include this in the upcoming CSAF version
- Draft definitions of the vulnerability status – based on actions needed
  - `Known_not_affected`
    - No mitigation is required regarding this vulnerability.
    - This could be because the code referenced in the vulnerability is not present, not exposed, compensating controls exist, or other factors. See {{{field x}}} for more details”
  - `Known_affected`
    - Actions are recommended to mitigate or address this vulnerability
    - This could include learning more about the vulnerability and context, and/or making a risk-based decision
  - `Under_Investigation`
  - `Fixed`
- Working with the Healthcare POC to test and align